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THE AUTOMOBILE

Making The Laboratory Pay

FIG. 1—SAND-BLAST EQUIPMENT VALUABLE FOR UNCOVERING DEFECTS IN FORGINGS AND OTHER PARTS, REMOVING THE SCALE, ALSO THE PRELIMINARY TO HIGHLY FINISHED WORK

HAVING decided, after long experience, that a certain type and design of automobile offers the greatest possible attraction to a given clientele, the E. R. Thomas Company, of Buffalo, N. Y., worked along the indicated lines, the result being the perfection of the six-cylinder long-stroke motor and the design of automobile that would best serve as a setting for this character of power plant. Looking at it from the laboratory standpoint, the first duty was to build the automobile as a whole, to do which required that the units composing the car be brought to a high state of perfection, inducing a condition of harmony and unity of the operating parts.

Last year, when this laboratory was pictured and reviewed in THE AUTOMOBILE, it was shown that the good work done had penetrated into the plant, and the automobiles that were manufactured under the reign of the laboratory were far more perfect than those of previous years, although the earlier products were shaped in the light of a growing laboratory experience.

But there were a large number of experiments still to be con-

cluded, and the gist of this review will have for its basis the further elucidation of the laboratory plan, pointing out some of the things that were done and showing how they added to the quality of the automobiles made and how the cost will be lowered in future sufficiently to compensate for the large initial outlay, reducing future operations to a certainty having a marked bearing upon "overhead" charges.

The laboratory is located in a large, well-lighted wing of the concrete construction plant, comprising, in the main, the equipment as follows:

(a) Complete equipment for chemical research.

(b) A testing machine, rated at 100,000 pounds, fitted with every modern convenience.

(c) A motor-testing dynamometer fitted with a manograph, recording instruments, and checking mechanisms.

(d) Means for investigating steel and other materials for the purpose of determining dynamic qualities.

(e) Besides the strictly laboratory equipment there is a large and well-equipped test room for motors, testing mechanisms for springs, and dynamometers for proving transmission gears, live rear axles, and other component units of the automobiles.

It will be understood that the regular tests of materials went on in a routine way day after day, which character of work was inaugurated at an earlier period and was alluded to in last year's review of the undertaking. The special investigations, while there were too many of them to find space in this article, will be appreciated if some of the more important of them will be here discussed.

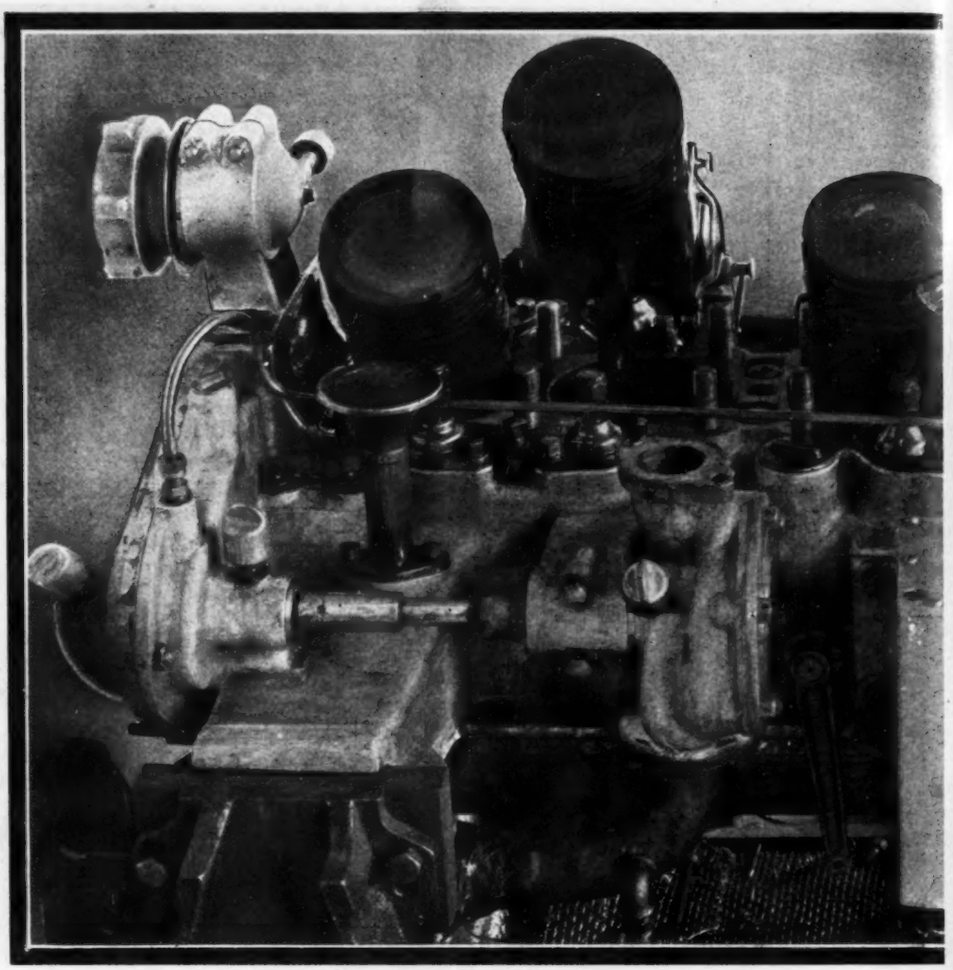


Fig. 2—Model M motor with the cylinders removed, showing the entire

The objects of the special investigations were (a) to reduce the cost of maintenance of the automobiles turned out, and (b) to lower the cost of manufacture, stopping up leaks and fixing a close limit upon so-called "dead labor." In attacking the problems of cost of maintenance the question of gasoline economy was taken up at great length from two points of view. It was recognized that the power of motors should be on the most flexible basis and it was found that carbon accumulations and other like troubles increased as the quality of automobile gasoline declined. In order to appreciate the progress that a year has brought in this important branch, reference may be had to Fig. 7 of a series of curves that are charted for the several carbureters, showing continual gains, not only in flexibility, but in total power of the motor as well. In the chart the speeds are set down in hundreds of revolutions per minute as ordinates, and the actual delivery of power is given as abscissa up to 65 horsepower. Each carbureter is given a curve and the lowest result was obtained in the curve F, showing that the power reached a maximum of 47 actual horsepower at 1,200 revolutions per minute. The curve E is quite different, both in characteristics and result. In this example the maximum power was realized at 1,600 revolutions per minute, but it may also be observed that there is little gain above 1,500 revolutions. This curve presents a gradual falling off of power with speed up to

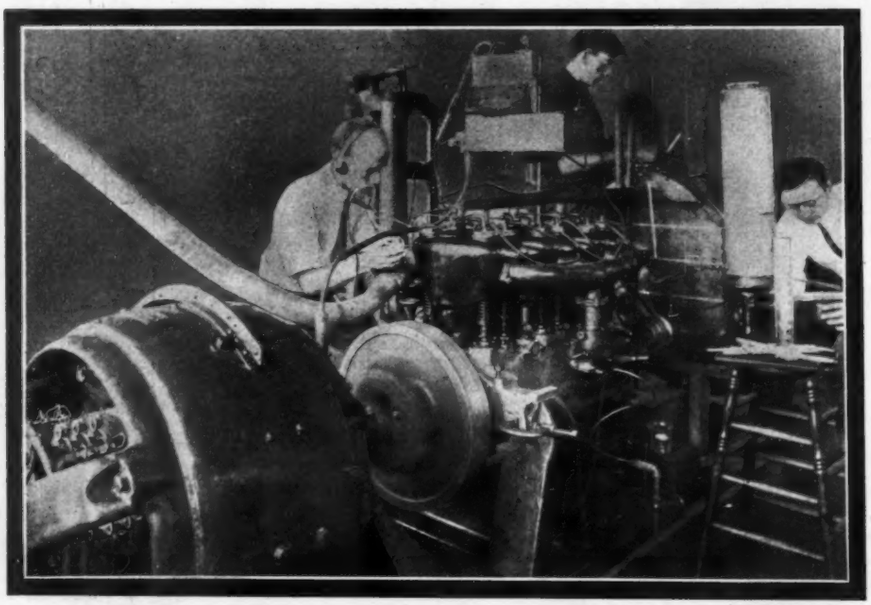
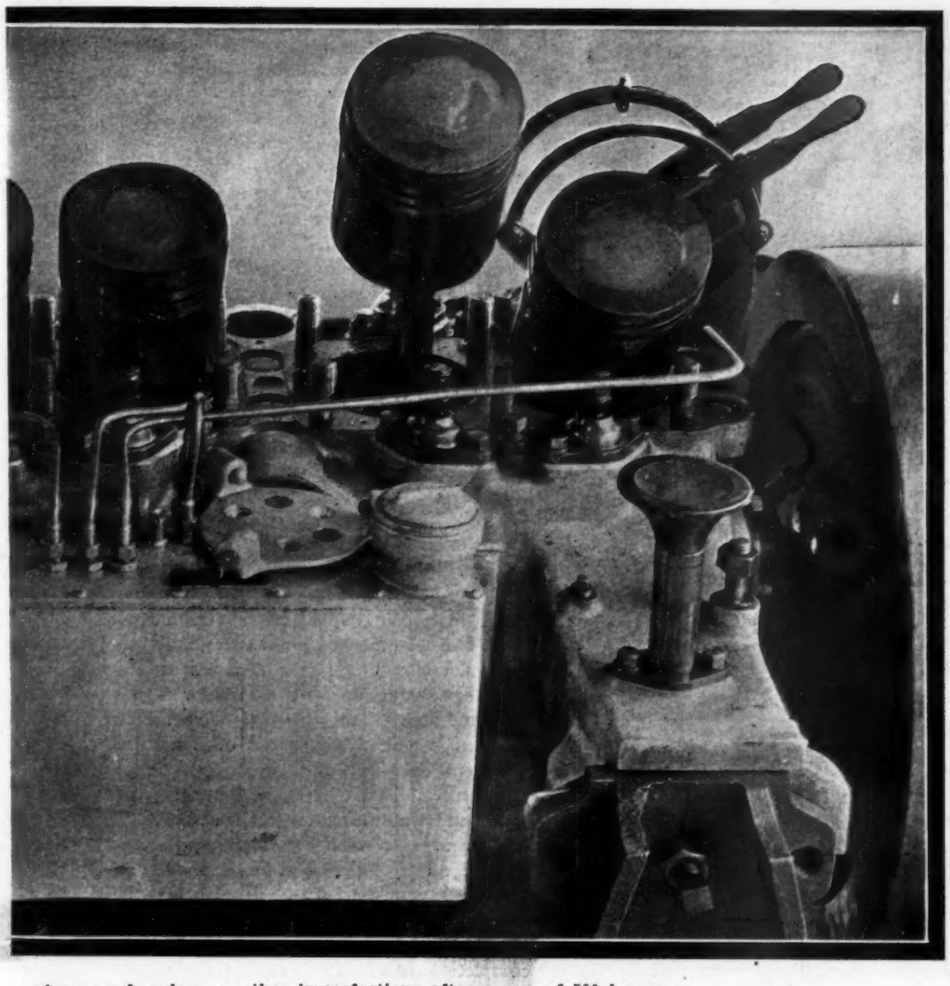


Fig. 3—Electro-dynamometer in conjunction with a manograph, fuel-weighing equipment and other facilities for use in determining the power, thermal efficiency and flexibility



absence of carbon or other imperfections after a run of 500 hours

1,200 revolutions as compared with the curve F. In the curve D this gradual lowering is corrected in a large measure, with the result that the actual power delivered is 58.5 at 1,500 revolutions per minute, but after events showed that even this result is below the best performance when the conditions are scientifically investigated. Curve C tells a better story; the performance was practically the same as that shown in curve D up to 1,100 revolutions per minute, with a delivery of 50 horsepower. Beyond this point the results shown in curve C are considerably better, resulting in a maximum delivery of 60 horsepower at 1,500 revolutions per minute. In the curve B a distinct betterment was made, due to the power increase at the higher speed; the droop was less precipitate at 1,500 revolutions and there was a gain of two horsepower besides. The best result of all is shown in curve A, delivering a maximum of 64 horsepower at 1,600 revolutions per minute; but, what is more to the point, the stability of the motor is considerably more pronounced at the higher speeds. The drooping of the curve is relatively slow; at 1,740 revolutions per minute the delivery is 60 horsepower, and following back on the speed range offers evidence of a much more substantial torquing moment. For illustration, at 1,000 revolutions per minute the readings are:

Curves A, 47.6; B, 45.6; C, 45.6; D, 45.6; E, 43; and F, 43 horsepower.

In order to obtain a better understanding of the results obtained in the test A, Fig. 7, the chart Fig. 8 is given.

Time Test to Prove Stability and Permanence of Adjustment

The difficulty experienced in the average laboratory lies in the falling off in practice, due to an artificial excellence that is induced on account of the better care and closer adherence to the requirements. One of the ideas in this effort was to make the laboratory test conform to the practical conditions, and in a 500-hour run, which is given in detail later, the motor was tested first to observe what it was capable of when new, and after the 500-hour run it was tested out in order to note the effect of such a long run upon the adjustments and the power delivery. The curves, Fig. 9, offer conclusive evidence of the result. In this chart the two curves are superimposed. The curve marked "before the run" shows maximum power at 1,600 revolutions per minute, and the curve marked "after the run" indicates an actual prolonging of the torque, resulting in maximum delivery at 1,700 revolutions per minute.

Both curves parallel each other for the whole distance, with a slight difference, up to about 1,400 revolutions, after which the curve marked "after the run" takes the mastery. The details of this 500-hour run will tell the rest of the story, but it is worthy of special note here that the motor actually improved in performance during the run, and from the point of view of the user it was a considerably better motor at the conclusion of the long and thorough test, under peculiarly severe conditions, than it was at the beginning of the run.

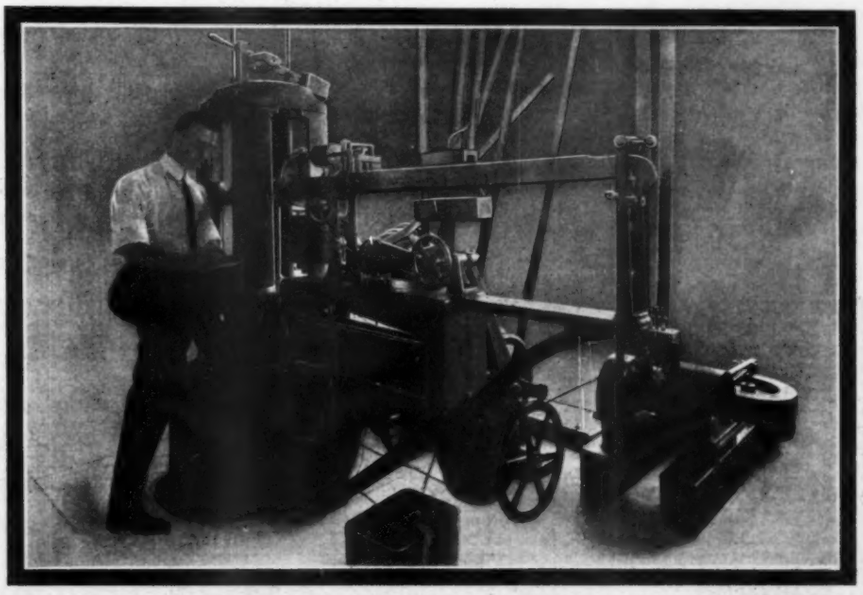


Fig. 4—Testing machine with a rated capacity of 100,000 pounds, fitted with an automatic recorder, and other means for determining the physical properties of the steel and other materials used in the automobiles

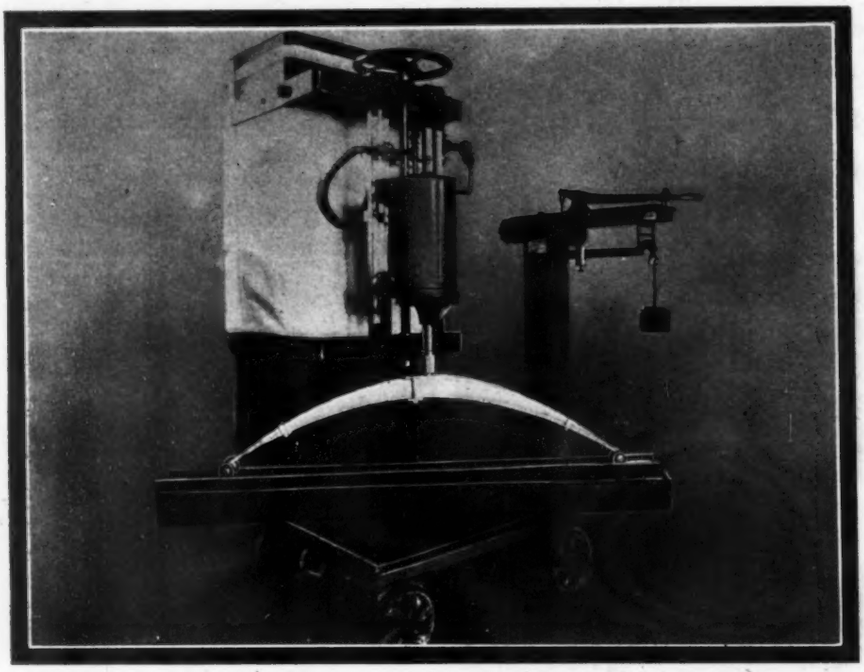


Fig. 5—Testing machine for investigating the quality and flexibility of the chassis springs, recording the deflections by means of a calibrated platform scales

The mere delivery of more power, or the better shape of the curve of power as it is shown in a chart, are relatively small matters as compared with the improving of the thermic results.

How the Thermic Conditions Were Bettered

Automobilists have had relatively little to complain of from the point of view of the general good performance of new motors, but the formation of carbon in the cylinders and the poor results obtained from the cooling systems, together with lubricating trouble, were all deferred for a time as a rule, falling like a wet blanket upon the men who were ill fitted to cope with such matters, and it was quite easy for experts to explain to them that they were careless, using too much lubricating oil or gasoline, and suffering from the practice of running upon a retarded spark.

All such explanations, although they failed in their purpose, were probably made in good faith by those who struggled without the advantages of a working laboratory, but investigation shows that the real trouble is due to the defects of design of the motor in nearly every instance, and Fig. 2 of the Model M, 6-cylinder motor, showing clean pistons after a 500-hour run, is evidence of what can be done if the problem is attacked in the laboratory and a fight is made with the stubborn facts rather than to be content with laying the trouble to operating causes.

Other Refinements Were Also Made

Passing over the timing of the motor for the moment, this being an important matter involving a study of the conditions, using the manograph and other suitable equipment, it remains to observe that the exhausting of the spent products of combustion, unless it takes place under well-defined conditions, is the source of not only a loss of power, but mal-thermic relations of a trouble-brewing nature. Unless the conditions are such that the fuel will burn to carbonic acid and water—nor can this be so if the back-pressure is excessive—the dreaded carbon formation will creep in and the power of the motor will diminish materially in service. But even this is relatively unimportant; the flexibility of performance, which is so much desired, will be gone.

What is this flexibility of performance and why is it desired? Were a motor so flexible that it would deliver power in adequate quantity at all speeds, there would be no occasion to employ a transmission gear system. Running on high-gear under all conditions of service was the dream of every automobilist not so long ago, and it was hoped that the coming of the 6-cylinder motor would deliver this benefit. Experience soon brought a realization of flexibility that thwarted this desirable end even in 6-cylinder motors, and it remained to study the problem and locate the interference with this good plan; the desired end was ultimately realized.

When the problems of carburetion were investigated at some length, the plan was headed off by exhaust trouble, and it at once became necessary to look into this phase of the thermic relations and find a remedy for back-pressure and fouling of the combustion chamber space by the residuum of gas, which prevented the further complete burning of the fuel; piling up of partially burned mixture was, of course, a very serious matter.

It will be necessary to critically examine the chart Fig. 10 in order to appreciate just what this means. In this chart the speed of the automobile on the road is given in ordinates in miles per hour, and the back-pressure is plotted as abscissa in pounds per square inch above atmosphere. The back-pressure increases with the speed of the automobile on the road, also with the opening of the throttle. What does this mean? Does it not show that back-pressure interferes (a) with the speed of the automobile on a level hard road, and (b) with the hill-climbing ability at a given speed? Having investigated the relations; learning how the obstructions acted and what the consequences were, it was a mere matter of continuing the effort along intelligent and indicated lines for a time sufficiently long to bring about a remedial condition. After having reduced the back-pressure to the lowest possible point, using a silencing ejector type of muffler, it still remained to work out a form of

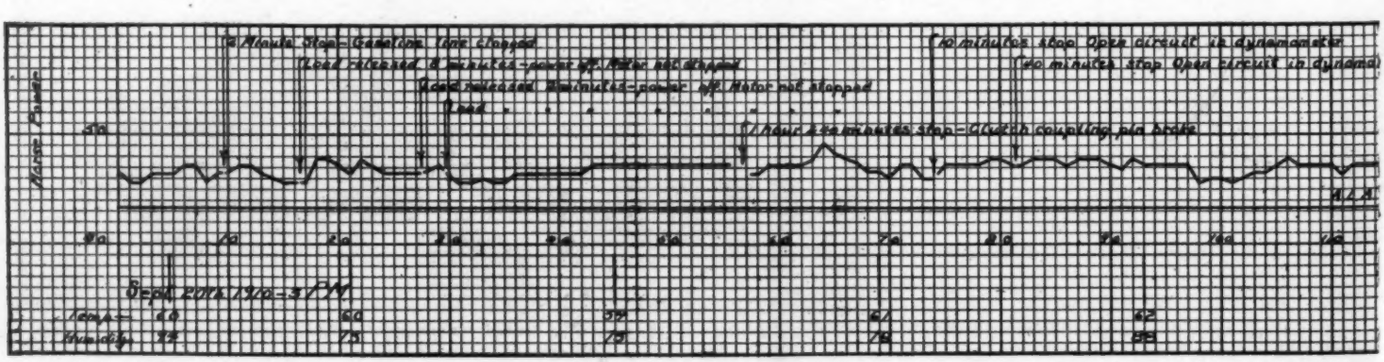


Fig. 13—Model M motor on 500-hour run, charting incidents of the perfor mance, giving the power variations at every instant of the run, tempera-

exhaust relief valve that would really have the virtue that practice accords this form of device. The curve Fig. 11 shows the result of the latter effort, reducing the back-pressure down to a maximum of 1 1-2 pounds per square inch, and to less than half of this value under hill-climbing conditions.

Engineering Laboratory Report of 500-Hour Run

Model M engine, No. 1037, 4 1-4-inch bore, 5 1-2-inch stroke, was set up in laboratory and underwent a test run to determine if the motor could equal the record of the new Daimler or Silent Knight, as tested by the Royal Automobile Club, March 15 to 28, 1909, and recorded in their certificate of performance, No. 118.

The conditions of the Knight test were:

(1) That the engine should be tested upon the bench for 132 hours, continuous running.

(2) That the horsepower given off should at no time during the test fall below the R. A. C. rating, multiplied by 1.3, the piston speed to be 1,000 feet per minute. If a higher piston speed should be used the minimum horsepower should be increased proportionally.

(3) That the temperature of the inlet should be kept at 50 degrees centigrade during the test.

(4) That upon completion of the bench test the engine, without any of its vital parts being disturbed, should be installed in a standard touring car and run for a distance of 2,000 miles on Brooklands track, this distance to be completed in not more than 60 hours of running time.

(5) That upon completion of the track test the engine should be again placed on the bench and run for five hours under the same conditions as the previous bench test referred to in paragraphs (1), (2) and (3).

(6) The certificate should show *inter alia*—

(1) A chart giving the horsepower readings to be taken not less than once every hour during the endurance test at the declared speed.

(2) A record of repairs or adjustments, if any. The following, however, while they might be recorded on the certificate, would not debar the engine from continuing its test; the time for necessary repairs being noted and the motor being called upon to make good such time under general conditions governing the test: Defects in petrol supply, water circulation, ignition system, exhaust piping, brake system.

(3) The fuel consumption per horsepower on the bench.

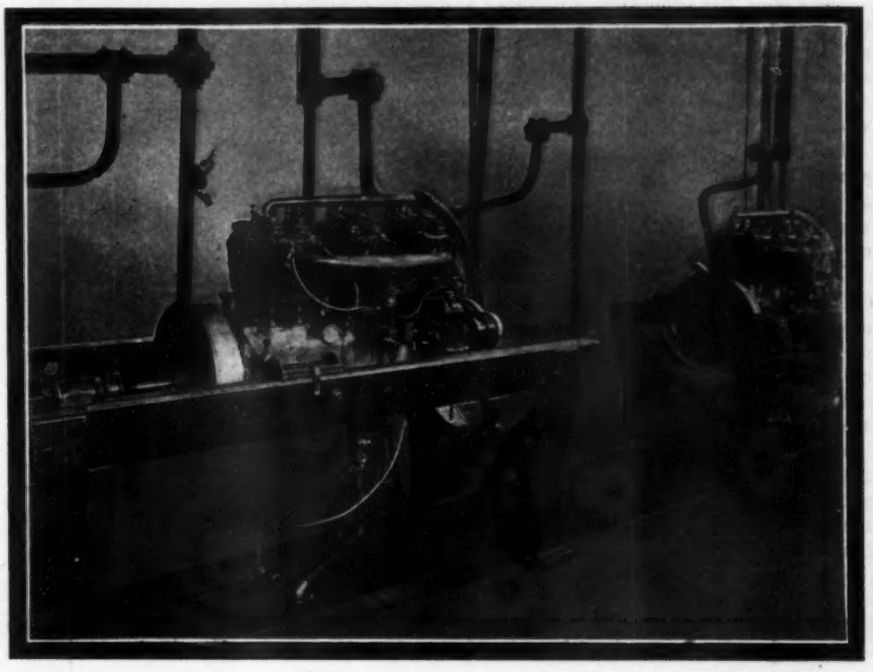


Fig. 6—Illustrating two units of the test stands which are available for testing all the motors produced for endurance, flexibility and power

(4) The degree of wear shown at finish on examination by the judges.

The speed entered for the trial was 1,200 r.p.m., giving a limit of 50.8 horsepower, below which the horsepower was not to fall.

Engine readings, taken and recorded every half hour, are shown on the chart accompanying this report, (Fig. 13).

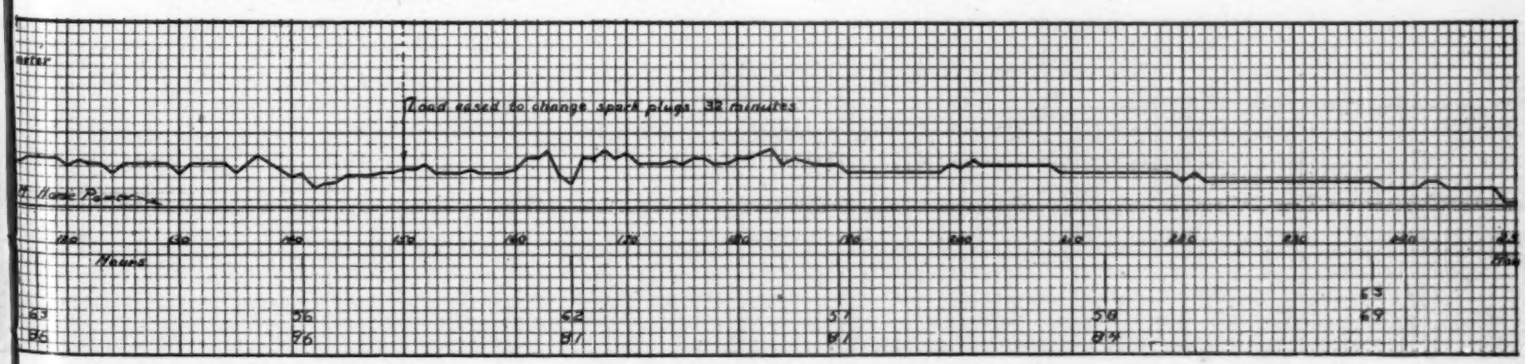
RESULTS OF 132-HOUR BENCH TEST

Total Time During which Load Was Eased	Duration of Tests	Stops Incurring Penalty		Stops not Incurring Penalty		Average H. P.	Gasoline Consumption	Consumption per H. P. Hour
Min.	d h m	No.	Dur.	No.	Dur.			Pint. Lbs.
19	5 14 15	0	0	5	116 min.	54.3	614.75	.679 .613

After this test the motor was installed in a car and run 2,159.5 miles, making about 20 miles to the gallon of gasoline. On completion of this run it was again placed on the block and run five hours under the same conditions as before.

RESULTS OF 5-HOUR TEST AFTER 2000 MILES ON ROAD

Duration of Test		Stops Incurring Penalty		Stops Not Incurring Penalty		Total Time During which Load was Eased	Average H. P.	Gasoline Consumption	Consumption per H. P. Hour
Hr.	Min.	No.	Dur.	No.	Dur.				Pint Lbs.
5	15	0	0	0	0	15 min.	57.25	22.5	.599 .541



...re changes during the performance, humidity of the surroundings, stating in detail the reasons for interruption, and other information of a pertinent

The engine was completely dismantled and no perceptible wear was noticeable on any of the fitted surfaces. The cylinders and pistons were found to be notably clean. The only noticeable wear in any part was caused by two point pins rubbing against adjacent parts. The ports of the valves showed no burning or wear.

The R. A. C. rating of the Thomas Model M is 43.89. The conditions of the Knight test required 43.89 horsepower × 1.3 = 57.05 at 1,000 feet per minute piston speed. As we used approximately 1,010 feet per minute piston speed, the horsepower of the motor should not fall below 58 horsepower during the test.

Owing to the small pipe supplying the laboratory with water and the varying pressure the lowest mean temperature we were able to keep the water at the inlet was 147.7 degrees Fahrenheit or 64.3 degrees centigrade as against 50 degrees centigrade required by the Knight conditions.

Motor No. 1037 was a regular stock motor taken from the assembly floor after it had completed its block test. After taking horsepower speed curve the motor was started at 3 o'clock p. m., September 20, and stopped at 3:14 o'clock p. m. on October 11, and another horsepower speed curve taken. Total actual running time of 500 hours. Outside of the above changes run was governed by the conditions of the Knight test.

The speed set for run was 1,100 r.p.m. The engine was observed throughout the trial and reading taken and recorded every hour. These records are submitted with this report.

TABULATION OF THE 500-HOUR TEST

Duration of Test	Stops Incurring Penalty	Stops Not Incurring Penalty	Total Time Load was Eased	Average H. P.	Gasoline Consumption	Consumption per H. P. Hour
d h m		No. Dur.				Pint Lbs.
21 4 14	nil	7 197 min.	57 min	47.7	3,235.4 U. S. 2695 British	1.085 .814 U. S. .904 British

At end of run cylinders were removed and valves taken out. A close examination of cylinders showed that they were in good shape. The reader will be able to judge of the condition of the pistons as they were after the run by examining Fig. 2 of a photograph taken at the time. This is a remarkable showing, as an average showing of 47.7 horsepower for 500 hours at a motor speed of 1,100 r.p.m is equivalent to climbing 17,660 miles up an 8.8 per cent. grade at 35.4 miles per hour with a 4,600-pound car, equipped with a 3 3-7:1 gear ratio and 37-inch wheels (Model M stock equipment).

$$\frac{D \times N \times 60}{3\ 3\text{-}7 \times 5{,}280} = \text{Miles per hour of car.}$$

When D = Diameter of rear wheels in feet.
N = r.p.m. of motor.
3 3-7 to 1 is rear axle ratio on high gear.

Computing from foregoing, miles per hour of car = 35.32.
35.32 × 500 = 17,660 miles total.
Assuming 80 per cent. efficiency of transmission.
47.7 × .80 = 38.16 horsepower available at rear wheels.

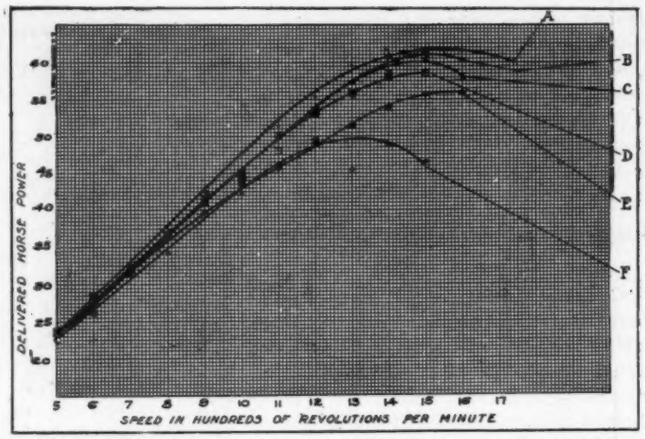


Fig. 7—Increase in power obtained by persistent investigation

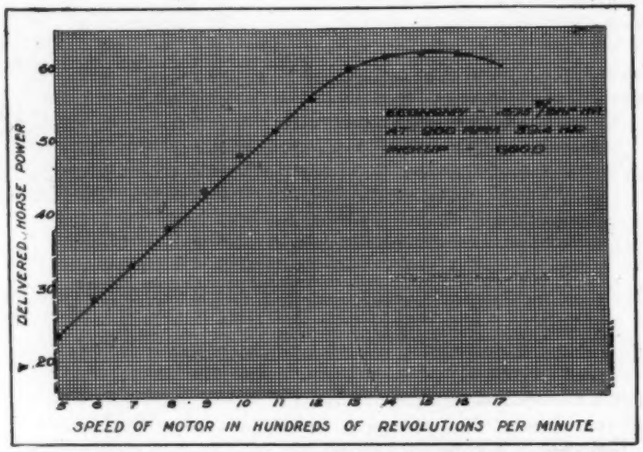


Fig. 8—Performance under conditions of perfected carburetion

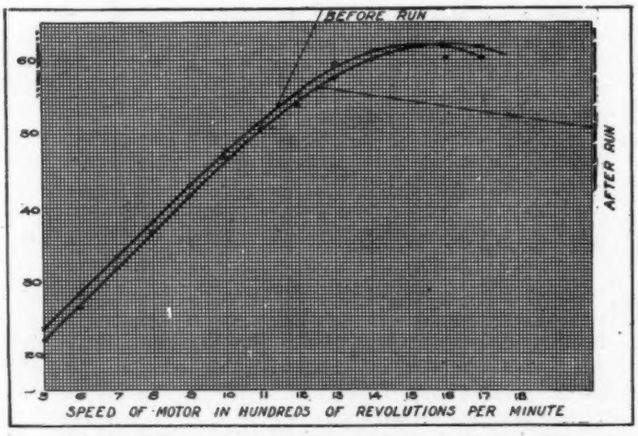
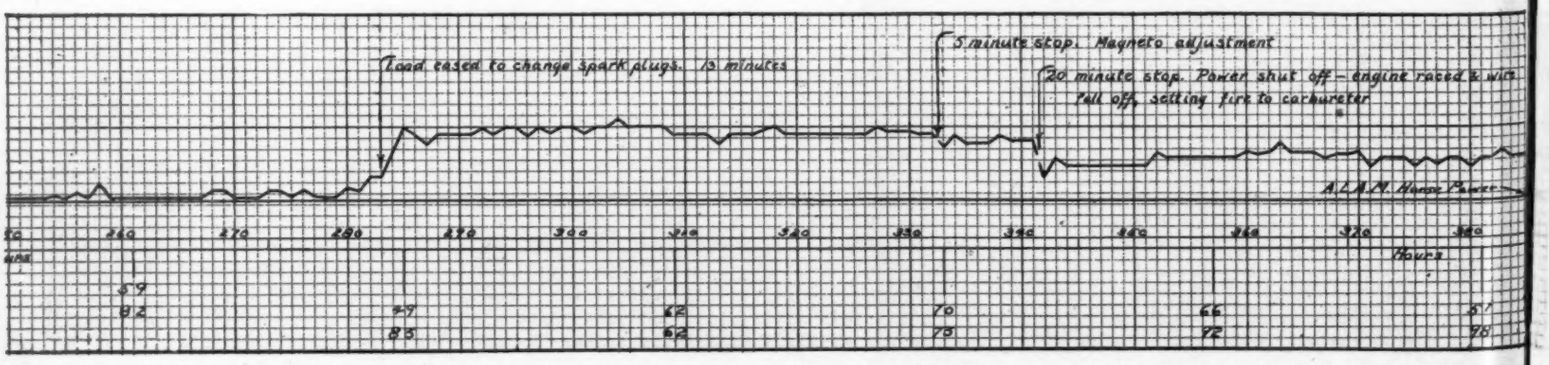


Fig. 9—Performance before and after the 500-hour test


Load eased to change spark plugs. 15 minutes
5 minute stop. Magneto adjustment
20 minute stop. Power shut off – engine raced & will fall off, setting fire to carburetor
A.L.A.M. Horse Power
Hours

character. This chart offers the advantage of showing the whole performance not unlike a bird's-eye view, marking off the variations of every character

Now $H.P. = \frac{DNP}{33{,}000}$ when P = pounds pull at circumference rear wheels.

Therefore:

$$P = \frac{33{,}000 \times H.P.}{DN} = \frac{33{,}000 \times 38.16}{\times 3.083 \times 320} = 405.2 \text{ pounds.}$$

405.2 pounds may be taken as the tangential pull (see Fig. 12) on rear wheels tending to push the car up a hill.

The piston heads were noticeably clean, as can be seen by Fig. 2. The shop numbers can be easily read.

The greatest difficulty experienced in this test was to keep spark plugs in the motor. With this carbureter a mixture could be obtained giving the greatest power, but so lean that the plugs could not stand the heat. One make of plugs which were absolutely tight would get so hot that the center electrode would melt off and pre-ignition would occur, continually pulling down the horsepower. Upon enriching the mixture this would cease, but the power would fall off. All six of the plugs in the battery system melted in this way and had to be removed, being replaced by solid steel plugs. Another plug used, even when not leaking, would cause pre-ignition. Upon removal the center electrode would be white hot. Three plugs of another make were tried with no better results. The pointed plugs, called "Petticoat" and "Conical," would heat up in the center, and the "Enclosed" would get so hot that the end would scale. Three plugs with glass insulators solved the trouble in Nos. 4, 5 and 6 cylinders but the three different makes of plugs in the remaining cylinders still continued to bother until finally three new plugs of one make were put in and saved the run. With this change and the air valve open a little the power increased from 45 to 50 horsepower, and the gasoline consumption fell from .916 to .74 per horsepower hour. No further pre-ignition occurred throughout the run. Motor was not stopped to change plugs.

As noted on the chart, a stop of 2 minutes occurred between the ninth and tenth readings, caused by gasoline line plugging.

Between the sixteenth and seventeenth readings the factory power was cut off for eight minutes. As this is used to excite the fields of the dynamometer the load had to be released for that time, although the motor continued to run at 1,100 r.p.m.

There is one point which is well worth noting by those who are seriously interested in automobiles, and that is that the load under which the motor had to labor for this long period of continuous operation was a much heavier burden than motors have to carry in regular automobile service.

Explanation of Figure Twelve

Referring to Fig. 12, to which attention was pointed elsewhere:

P = tangential effort on rear wheels tending to push the car up hill.

W = weight of car.

when,

$$\text{Sin. } \Phi = \frac{P}{W} = \frac{405}{4{,}600} = .088$$

$\Phi = 5° 3'$, which is the equivalent of an 8.8 per cent. grade.

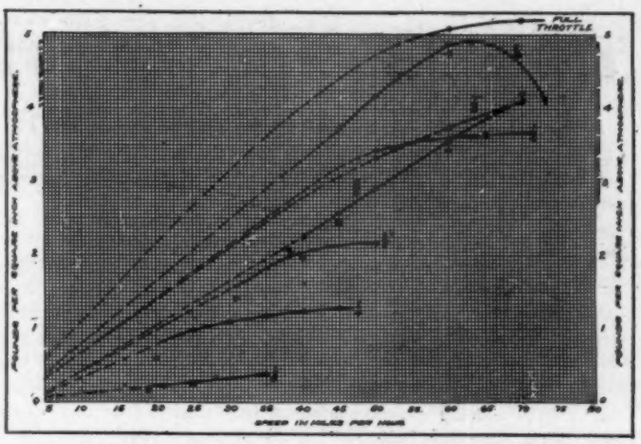


Fig. 10—Back-pressure investigations under various conditions

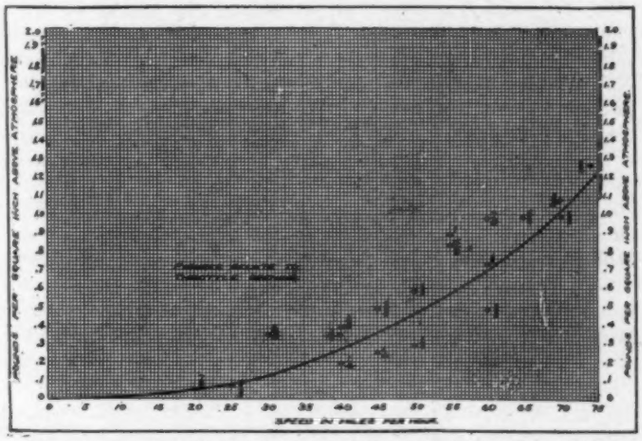


Fig. 11—Curve of back-pressure with various throttle openings

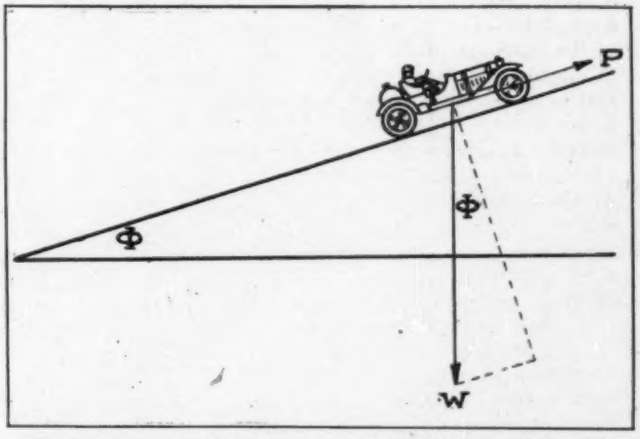
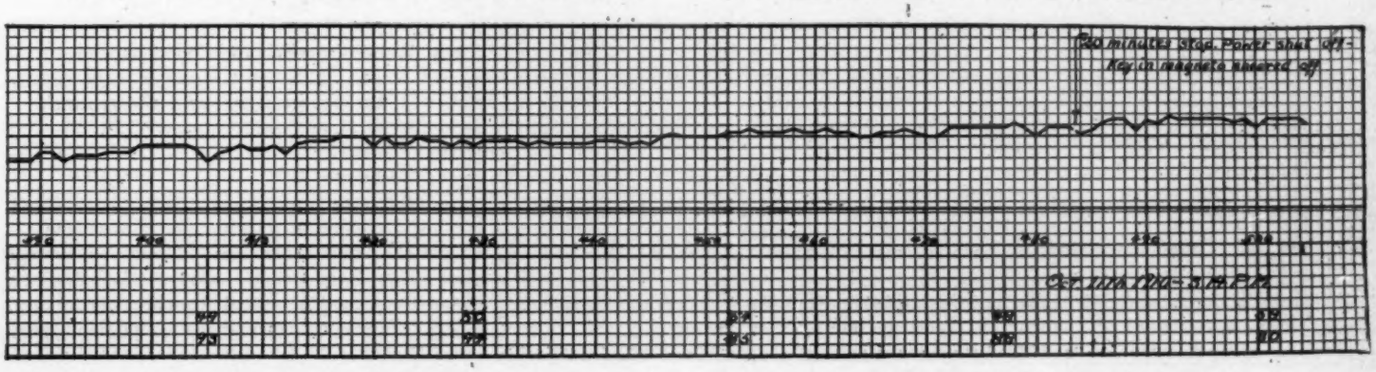


Fig. 12—Tangential effort on rear wheels to push car up hill



and denoting the periods of interruption in comparison with the lengths of runs, making, on the whole, an exact history of the event

Economy of Production

A PROMINENT AUTOMOBILE ENGINEER POINTS OUT HOW COST MAY BE REDUCED WITHOUT CUTTING INTO QUALITY OF THE AUTOMOBILES TURNED OUT

SURELY the reason for the existence of the engineer is not alone the designing or shaping of material; he must likewise provide for the economical use of material. Savages can bridge a stream by piling enough rocks across it; but when it comes to building a Brooklyn Bridge the engineer is the one who makes the accomplishment economically possible. The farther away we get from engineering practice the more often we find ten pounds of material used to do the work that might have been done with one.

In the automobile business, as in every other new industry, the first attempt was to make something that would work. A number of the very earliest cars, however, showed evidence of clever and good design. An economical use of material was made which permitted of the low price necessary to introduce a new type of vehicle. Then the automobile slowly became a thing of luxury. Comforts unthought of in the earlier days of vehicle design began to appear. Requirements became more and more exacting. On good roads the motor car was expected to carry a man with the speed of an express train and with all the comforts of a Pullman car. These requirements were met, but to meet them it was necessary to put more horsepower in fewer pounds of steel than had ever before been done in the history of the world. This was done by making one pound of steel do the work that had previously been done by two. The development of new kinds of steels became necessary, and to-day the entire steel industry has received an impetus toward quality. Where at one time the government alone demanded steels of superior grade, now the demands are from a thousand sources.

To-day the automobile business is passing into another stage of its development. Owing to increased competition and to an increase in the value that has been given the purchaser, it has become imperative that the manufacturer reduce the cost but not the quality of his product. This has opened a large field for the engineer who has commercial as well as creative instincts.

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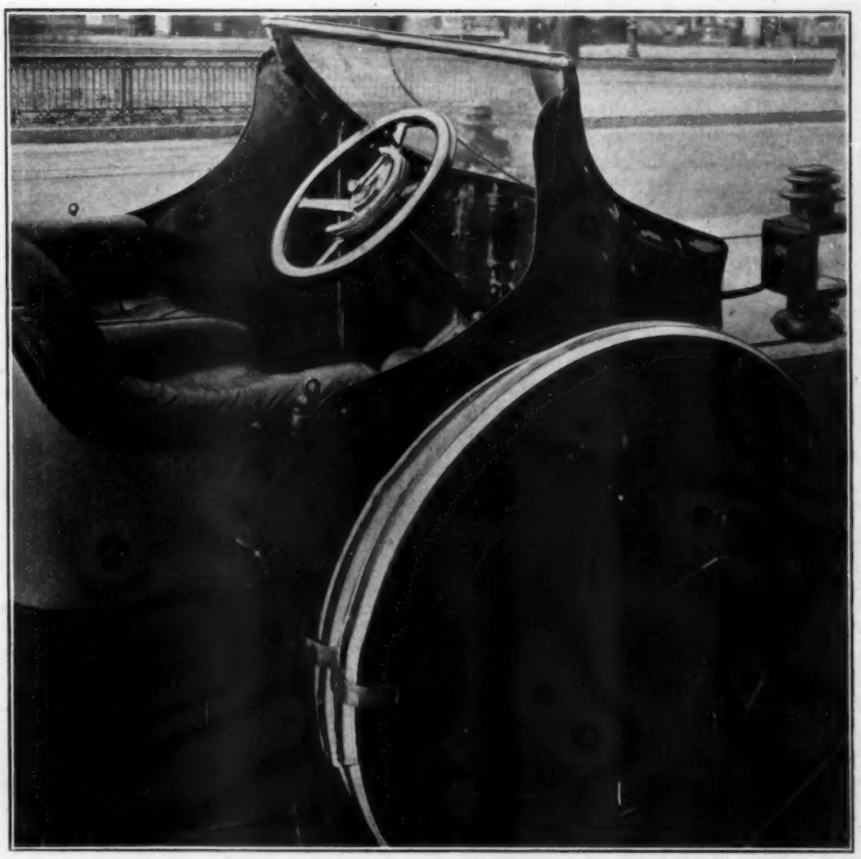

REGULAR TYPE OF AUTOMOBILE BODY EQUIPPED FOR WINTER USE

Economy of Production

A PROMINENT AUTOMOBILE ENGINEER POINTS OUT HOW COST MAY BE REDUCED WITHOUT CUTTING INTO QUALITY OF THE AUTOMOBILES TURNED OUT

SURELY the reason for the existence of the engineer is not alone the designing or shaping of material; he must likewise provide for the economical use of material. Savages can bridge a stream by piling enough rocks across it; but when it comes to building a Brooklyn Bridge the engineer is the one who makes the accomplishment economically possible. The farther away we get from engineering practice the more often we find ten pounds of material used to do the work that might have been done with one.

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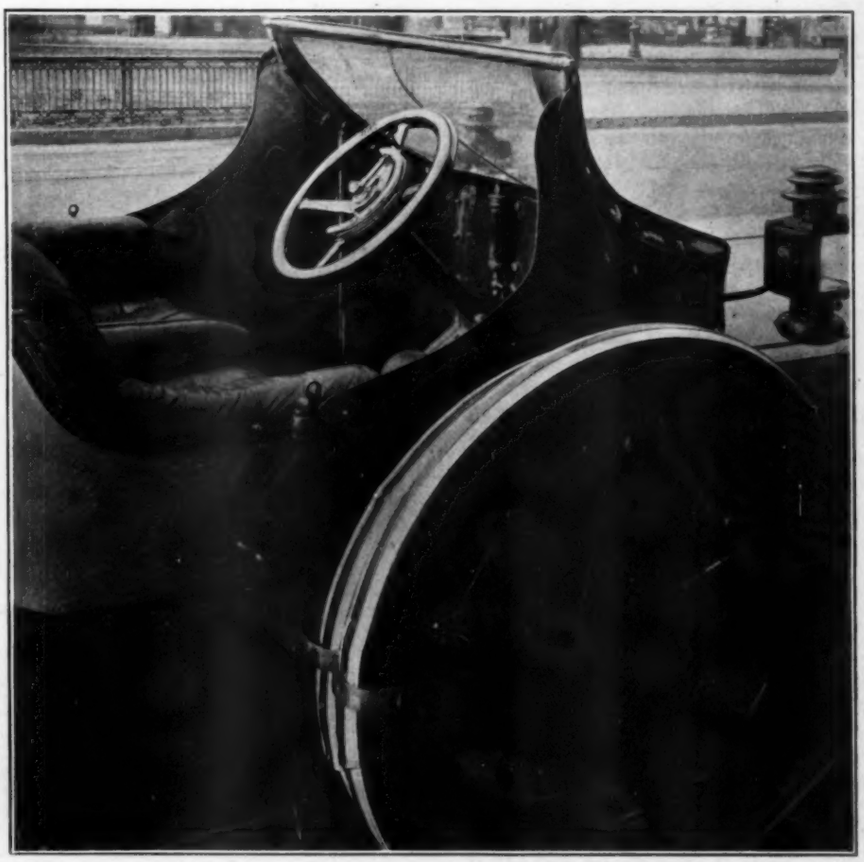


REGULAR TYPE OF AUTOMOBILE BODY EQUIPPED FOR WINTER USE

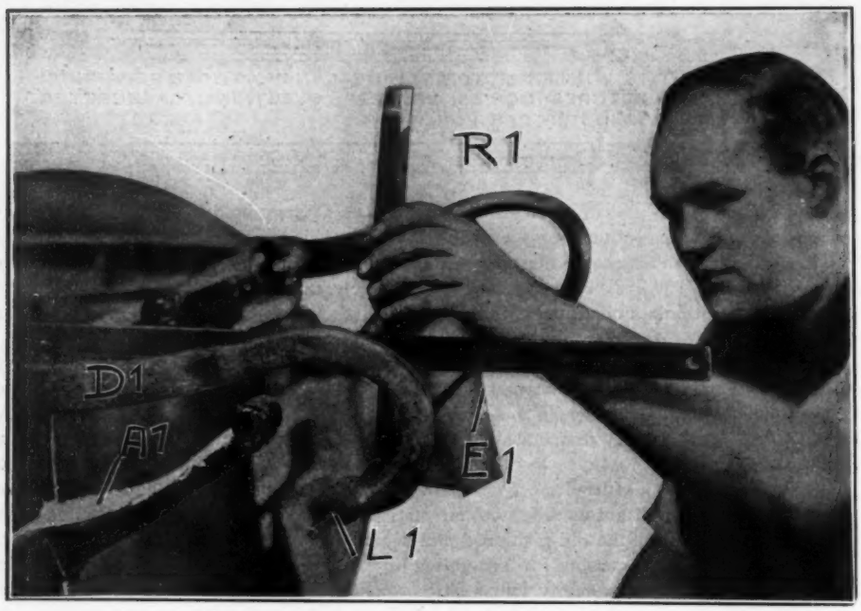


Fig. 1—Measuring height of dumb iron that has been bent and straightened by means of straight edge rule and lining rod.

Practical Repairing

PRESSED steel frames have now become almost universal in automobile practice, and therefore it would serve little purpose to deal with other forms of frames that have been used from time to time, such as the armored wood and tubular varieties. Suffice it to say that in quite a number of cases the whole frame has to be taken apart to effect a repair on those two types or to reinstate the alignment.

The most common cases that the repairer is called upon to deal with are the direct cause of an end-on collision either front or rear, and these can be usually effected without the necessity of dismantling the chassis. The primary tools required are good blowers and the usual bending irons. The eventual cleanliness of the job depends upon the smith's skill and the facilities at his disposal to properly heat the bent part.

Fig. 2 shows the rear dumb iron or spring holder that has been bent down owing to a car running backward and striking a wall, the result being that the left-hand member was forced down about two inches. Restoring the frame to its original shape in this case is a very simple matter, and is effected in the following manner: The cross member of the frame is blocked up with a trestle and blocks of wood, and the spring bolt is withdrawn, allowing the left spring to drop and the weight of the rear axle to rest on the tire. Strips of asbestos that have been immersed in water are laid on the spring to protect the paint from the heat and the temper of the springs. Heat is applied to the dumb iron D1 at the point where the bend has taken place by means of the blowers F1 and F2, which are fed by gas through the pipe G1 and blast air through the pipe A1. The pressure in A1 is obtained from a compressor run off the machinery shafting by belt, and the amount of force of air and gas is regulated by two turn-cocks under the immediate control of the driver's right hand. One or two flames can be directed on the work while the smith grips the frame with lever L1 in such a manner that as soon as the heat has softened the steel it will give and bend upward, the operator having previously gauged just how much lifting is required.

The operation of finding the correct height can be seen by reference to Fig. 1. A straight edge E1 is laid on the side member of the chassis, protruding over the end of the dumb irons; a rod L1, called a lining-up rod, is passed through the spring bolt holes, and from this to the square edge the smith can see exactly by measuring with a rule R1 whether the height is correct or if it requires still more alteration. The springs in this case are attached to the frame by shackles that give as the torque is thrown on the axle. After the bending operations are completed the frame is filed up smooth and allowed to cool off, when it will be necessary to send it to the paint shop, as naturally all the paint will have been burnt off.

With the front end of the frame matters have not such plain sailing, owing to the different shapes that U section metal takes when bent; these are naturally governed by the force of the

Fig. 2—Straightening bent dumb iron of frame by blast heating and using bending iron

STRAIGHTENING FRAMES; PRECAUTIONS TO PREVENT THE EFFECT OF A BLOW; GENERAL BRAZING

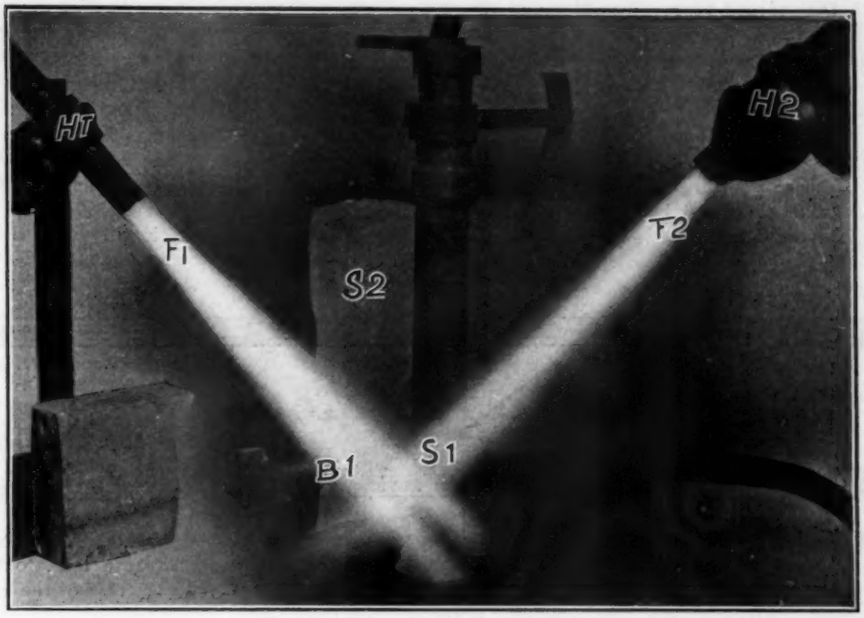


Fig. 3—Brazing new clutch pedal to transverse shaft after same has been pinned

blow and the direction from which it comes. It can be taken for granted that repairs are possible to the front end of the frame without having to fit a new side member, but this is a matter that requires more than passing thought, because it is often cheaper to have a new side member fitted if the frame is badly cracked than to have horn plates and new spring holders riveted and welded; besides, there is always the indelible mark of an accident to offend the eye and greatly depreciate the value of the car. Fig. 4 shows a frame F1 that was subjected to a violent impact with a telegraph pole, but most of the strain was taken in the cross member S1 that had been placed in front of the radiator as if by Providence. Such a cross bar would be a useful adjunct to any car, as besides strengthening the frame it protects the radiator in case of a vehicle backing. Much the same method is employed in straightening the front member as in the case of the rear, except that a certain amount of hammering is necessary to even up the U section at the point of bending. The radiator must first be removed and the engine casing protected by metal sheets and asbestos boards; there being so many parts to hold the frame rigid—as the engine arms A1 and A2, cross members and transmission arms—that it is usually only a matter of straightening the dumb irons, although the entire frame must be tested for lateral strains. It must be borne in mind that when the frame is released from the springs it has a tendency to curve inward, as it does in Fig. 4, but not to such a marked degree; consequently, when the frame is straightened allowance must be made for this. It is advisable in ordinary brazing jobs to have some means of holding the blow-pipes, and such can be seen in Fig. 3, H1 and H2. By this means the flame is directed on the part to be heated, whereas holding by hand the operator usually moves the flame, thinking thereby to hasten the heating. Such is not the case; a steady flame on one point will heat quicker than when it is moved about.

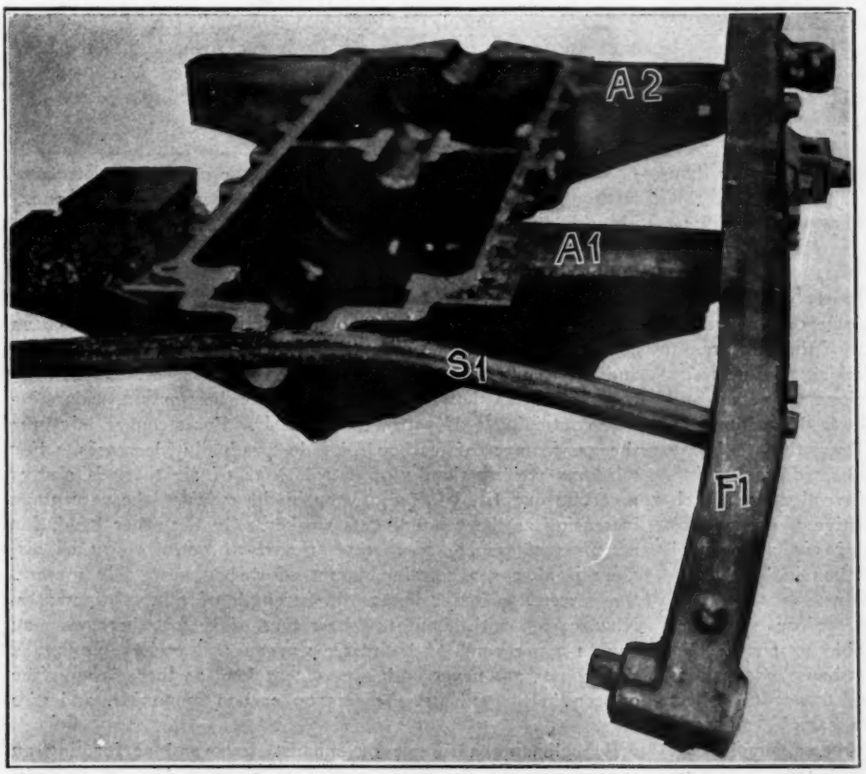


Fig. 4—Impact of a bad blow saved by the cross member fitted in front of the radiator

At the rear should be placed fire bricks or a sheet of metal, S2, and the job itself placed in such a manner that when the brazing rod or powder is applied the latter will run into the parts to be joined, S1. In this case it is a clutch shaft on to which a new pedal arm has to be fixed. The parts must first be cleaned with a file. The temperature of the flames F1 and F2 is greater in inverse proportion to their size, and the smaller a flame becomes the hotter it is and the more work it will do, provided the air is not supplied in excessive quantity. Parts such as these or the flanges on exhaust manifolds should be pinned before brazing, to overcome vibration and to hold the work together during the heating, as when the metal expands the parts may slip. Preventives against collision are so numerous that it is a matter for the autoist to choose the one that best suits his car or pocket; the point to be careful about in fitting one is to see that in case of an accident the tire cannot come into contact with the sharp ends and so cause perhaps twice the damage that would be entailed if the frame alone had to be straightened.

In Diagnosing Motor Trouble—

If the motor comes to a stop after a long run, look in the gasoline tank.

If the tank holds gasoline, see if the same reaches the carbureter.

If there is no trouble up to the carbureter, observe if gasoline passes out of the nozzle.

If there is plenty of gasoline available, it suggests the possibility that there may be too much.

If the gasoline flow is satisfactory, examine the air valve.

If the ratio of gasoline and air is right, look for water.

If there is no trouble up to this point, see if the intake manifold is tight.

If the mystery still persists, go over the ignition wiring connections and tighten them up.

If there is no relief, take out the spark plugs and test them.

If the spark is feeble in the open air, it will be worse under compression in the cylinder.

If there is a poor or no spark it is due to a weak battery or an open circuit.

Cantor Lectures on Motors

PROFESSOR W. WATSON, D.SC., F.R.S., DELIVERED A SERIES OF LECTURES ON THE GASOLINE MOTOR, OF WHICH THIS IS THE SIXTH INSTALLMENT—BY PERMISSION OF THE ROYAL SOCIETY OF ARTS

We now come to the consideration of the chemical nature of changes during combustion of petrol and air. The chief constituent of ordinary petrol is the hydrocarbon hexane (C_6H_{14}), mixed with a certain proportion of the other members of the paraffin series. When petrol is burnt in the presence of sufficient air or oxygen the carbon is almost entirely converted into carbon dioxide (CO_2) and the hydrogen into water. If, however, the supply of oxygen is deficient, then, in addition to carbon dioxide and water, there are also produced carbon monoxide (CO), hydrogen (H), and methane, or marsh gas (CH_4). Now these three gases (CO, H, and CH_4) are all combustible when mixed with oxygen, and hence it is obvious that the presence of such gases in the exhaust of an engine involves a waste, for we are discharging into the air part of our fuel, not, it is true, unaltered petrol, but since it is combustible it is fuel. The water produced by the combustion of petrol amounts to about one and a half times the weight of the petrol, and hence it is not surprising that when starting up an engine, so that the silencer is cold, a considerable quantity of water is often found to drip from the silencer or exhaust pipe.

If we take a certain volume of petrol vapor and air at, say, 110 deg. C., and, after firing the mixture, allow the products of combustion to cool down to the original temperature of 110 deg. C., it is found that if the pressure be adjusted to the original value, the volume of the products of combustion is greater than the original volume of air and petrol vapor. The amount of this increase in volume on combustion for different strengths of mixture is shown in Fig. 25. It will be noticed that for mixtures containing more than 14 parts of air to 1 of petrol, the increase of volume on combustion is very nearly constant. In in the case of richer mixtures, increase in volume on combustion increases rapidly with the increase in strength of the mixture.

Since the nature of the chemical changes which take place on combustion depends on the relative proportions of petrol and air present, we can, by a study of the products of combustion, *i.e.*, the exhaust gases of the engine, investigate the relative proportions of air and petrol taken in by the engine.

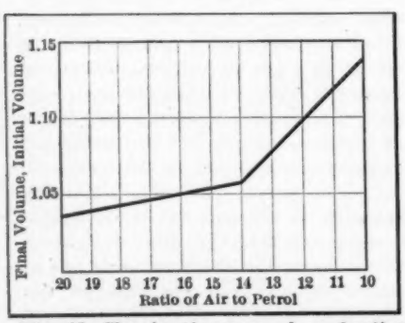


Fig. 25—Showing increase of combustion for different strengths of mixture

Before we are able to analyze the exhaust gases it is necessary to collect a sample, and this process, simple as it may seem, is one requiring considerable forethought. If a collecting vessel is simply connected, by means of a tube, to the exhaust pipe between the engine and the silencer, and the exhaust gases are allowed to blow through the vessel for some time, it by no means follows that the final contents of the vessel will be exhaust gases uncontaminated by air. The reason is that even with a four-cylinder engine, and much more in the case of a single or two-cylinder engine, the pressure in the exhaust pipe is often during a part of the stroke below the atmospheric pressure.

That this is the case is shown in Fig. 26, which gives for three different speeds the manner in which the pressure in the exhaust pipe of a four-cylinder engine varies during the stroke. It will be noticed that at all speeds the pressure sinks about 2 lbs. per square inch below atmospheric at some part of the stroke. Hence, if the collecting vessel is simply connected to the exhaust pipe by one tube, a second tube being provided to allow the escape of the air from the vessel, then while it is true exhaust gases blow through the vessel during the greater part of a stroke, yet during the remainder of the stroke, when the pressure is below atmospheric, air is sucked back into the sampling vessel. Hence, to obtain a true sample of the exhaust gases, some form of non-return valve must be fitted to the outlet from the vessel. There is no doubt that some of the very anomalous results which have been obtained, in particular the finding of oxygen in the exhaust when there is incomplete combustion of the petrol as shown by the presence of carbon monoxide, are due to faulty collecting of the samples.

The results of the analysis of a large number of exhaust gas samples, obtained when using different strengths of mixture, are shown in Fig. 27. In this figure the ordinates are the percentages of CO_2 O_2 and CO, obtained after the steam has been condensed. It will be seen that, starting with a weak mixture and increasing the strength of mixture, the percentage of carbon dioxide, as shown by the upper curve, increases up to a mixture containing 1 of petrol to 14 of air. For stronger mixtures the percentage of carbon dioxide gradually decreases. For mixtures weaker than 1 of petrol to 14 of air there is always a certain quantity of free oxygen in the exhaust, the percentage increasing as the mixture gets weaker. On the other hand, for mixtures containing more than 1 part of petrol to 14 of air, there is always a certain amount of carbon monoxide present, the percentage increasing as the strength of mixture increases. Now, except with about 14 of air to 1 of petrol where we may have 1-2 per cent. of both free oxygen and carbon monoxide, these gases are never both present; as long as there is any free oxygen in the exhaust there is no carbon monoxide, and *vice versa*.

By collecting a sample of exhaust gases and performing an analysis we can, by means of curves given in Fig. 27, immediately deduce what was the ratio of air to petrol taken by the

engine at the time when the sample was collected. Hence, if samples are collected with the engine running at different speeds and with different throttle openings we are able to examine the working of the carbureter and, if necessary, adjust it, so that the strength of the mixture may remain, if not correct, at any rate within reasonable limits for all working conditions. As an example of such an investigation I may quote some results taken with my own car. After the car had been in the hands of the makers, and the carbureter had been adjusted by their tester, I took a series of samples of exhaust gases with the following results:

Speed of car	Throttle	Per cent. of CO in exhaust
18 m.p.h.	full open	9.6
23 "	½ open	2.2
Clutch out, engine turning slowly		0.4

Now, 9.6 per cent. of carbon monoxide in the exhaust represents a waste of about 36 per cent., due to incomplete combustion of the petrol, while even 2.2 per cent. of carbon monoxide represents a waste of 9 per cent. It was evident that the carbureter had been adjusted so that when the engine was running light, with the throttle almost closed, it would get a sufficiently strong mixture to work regularly, and that with this adjustment when the throttle was opened the mixture became much too rich. Further examination showed that when the engine was running light the petrol was not being properly vaporized, for a steady trickle of liquid was found to flow out of the bottom of the carbureter. By arranging a small cone of wire gauze below the jet, so that any petrol which flowed down the sides

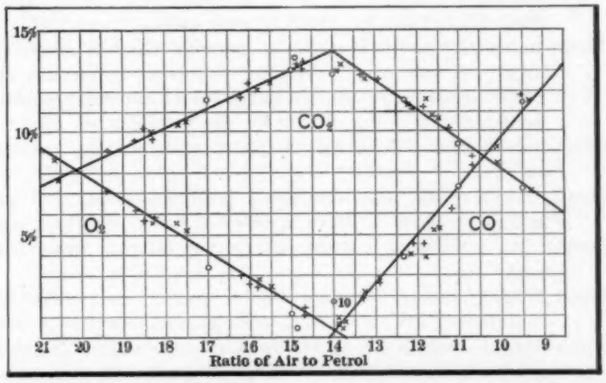


Fig. 27—Chart showing results of analysis of various exhaust gas samples, obtained from different strengths of mixture

was spread out over the gauze, evaporation was so much improved that no liquid petrol escaped. The air now took up, even with the throttle almost closed, so much more petrol vapor that the supply of liquid could be very much reduced. This, together with a hand-operated extra air valve, caused the working of the carbureter to improve to such an extent that, in place of getting 28 miles to the gallon, 42 miles was obtained, while the following results for the exhaust gas analysis were obtained:

Speed of car	Throttle	Per cent. of CO in exhaust
18 m.p.h.	full open	0.0
21 "	¾ open	0.4
21 "	½ open	0.0
Clutch out, engine turning slowly		0.0

As another example of the utility of exhaust gas analysis when investigating the working of an engine, we may take some analyses made of the exhaust of the two-cycle engine from which the diagrams shown in Fig. 15 were obtained:

	Speed of engine (revolutions per minute) 640 Per cent.	1,500 Per cent.
CO_2	6.8	10.0
O_2	7.6	1.6
CO	2.0	4.8
H_2	0.7	1.7
CH_4	0.2	0.2
N	82.7	81.2

It will be observed that at both speeds we get free oxygen and carbon monoxide in the exhaust, while it will be remembered that in the case of a four-cycle engine these two gases are never found simultaneously. The reason for the difference is that while in the four-cycle engine, where the exhaust valve and the inlet valve are never open at the same time, it is impossible for the fresh charge which is entering to escape through the exhaust valve, in the case of the two-cycle engine it is quite otherwise. The exhaust port is open all the time during which the inlet port is open, and even after the inlet port is closed on the compression stroke, and although a baffle plate is fixed to the top of the piston so as to prevent the incoming charge from blowing straight across to the exhaust port, yet it is quite easy for some of the fresh charge to escape. Now, since there is some carbon monoxide in the exhaust, it follows that all the oxygen contained in that part of the fresh charge which is retained within the cylinder has been combined with the carbon and hydrogen of the petrol, and therefore all the free oxygen found in the exhaust must have blown straight through from the inlet to the exhaust port. From the percentage of nitrogen in the exhaust we can at once calculate the quantity of oxygen which accompanied this nitrogen in the air which was taken into the engine, since the proportion of nitrogen to oxygen in the air is always the same. Thus 82.7 volumes of nitrogen must have been accompanied by 82.7 x 0.266 or 22.0 volumes of oxygen. The analysis shows that 7.6 volumes of oxygen must have escaped through the exhaust port during the time the fresh charge was entering. Hence

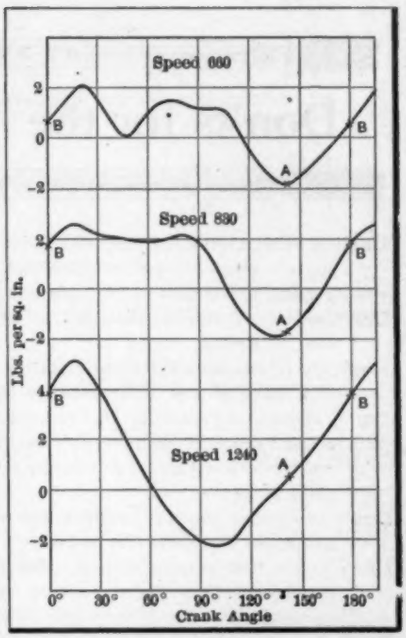


Fig. 26—Chart showing variation of pressure in exhaust pipe of four-cylinder engine

$$\frac{\text{Oxygen which escapes}}{\text{Total oxygen taken}} = \frac{7.6}{22.0} = .345.$$

Now the oxygen which escapes bears the same ratio to the total oxygen which enters through the inlet ports, as does the charge which escapes to the total charge. Hence

$$\frac{\text{Charge which escapes}}{\text{Total charge}} = .345.$$

In other words, 34.5 per cent. of the charge, which enters the engine at a speed of 640 revolutions per minute, escapes through the exhaust port, and hence is, of course, entirely wasted.

A similar calculation made for the speed of 1,500 revolutions per minute shows that, at this speed, only 7.4 per cent. of the charge escapes. The reason for the much larger escape at the slow speed is at once evident from a study of the crankcase diagrams given in Fig. 15. The much larger charge per stroke taken into the crankcase at the slower speed, and hence the larger volume of fresh charge driven into the cylinder is responsible for the large loss of charge through the exhaust port.

If you see an automobile approaching at a brisk pace, give it sea room; it may cast a shoe just alongside of you.

If you hear a strange noise, make an investigation; it might be due to a hollow lubricating oil tank.

Don'ts for the Automobilist

FOR THE BENEFIT OF THOSE WHO NEED NUDGING; DEALING WITH PROBLEMS OF EVERY-DAY OCCURRENCE; APPLICABLE TO THE AUTOMOBILIST AND THE CITIZEN

Don't lay the blame on your collaborators if you fail in some undertaking. If you are a bungler there will be no concealing the defect in any case.

Don't imitate children; they blame others for what they do that is wrong.

Don't try to transfer the responsibility for an act that is yours if it fails to pay a dividend.

Don't attempt to assume the responsibility for an act that is not yours if it does threaten to pay a dividend; the elusive little fellow might escape after you acknowledge the child as yours.

Don't surrender your reputation for being honest by trying to escape the blame for a fault.

Don't forget that anyone would rather have an honest (though imperfect) man than a person who is smart and irresponsible.

Don't be grieved if you naturally would like to take credit for good deeds and escape responsibility for the other kind—so would all your acquaintances.

Don't shirk responsibility just because there is a good chance of failure—could your employer find a better risk than you, he would do so.

Don't expect to shine with an efficiency of 100 per cent. No man ever lived in such fierce light.

Don't be satisfied with an efficiency of less than 66 per cent. Your friends will be disappointed in you if you are.

Don't be a lone fisherman; find out what others expect of you; see if you cannot merit their approbation.

Don't try to reduce the number of your enemies; have you forgotten that it is they who urge you on?

Don't let your friends baby you too much; it is nice of them, but it spells inactivity, and, what is worse, the intellect is lulled into a dangerous sleep.

Don't forget that a good friend makes a vigorous enemy; try to draft your enemies from the outside world.

Don't invite your enemies to lash you into a fury; just arrange with them to give you a sting of the whip when you need it.

Don't be bashful; your enemies will accommodate you any time that you request them to act.

Don't be blind; masks are worn by those who need them; masked faces are not good to look upon.

Don't be suspicious; if you are in financial trouble, consult a lawyer; if you are ill, send for a doctor; but if you are suspicious of some one, consult a friend and rely upon his judgment.

Don't impose upon a democratic spirit; you might wear out your welcome.

Don't imagine that you are using influence when you are swinging a club.

Don't club intelligence; you will be annihilating your best asset.

Don't forget that intelligence would have to be clubbed to death before it would bow to such a crude device as a club.

Don't hide the real merit that resides in your effort, and then substitute brutality when you go in quest of recognition; let the good quality shine; it will bring a response.

Don't forget that brutality is the most objectionable when it is dressed for a saunter 'midst refined society.

Don't overstep the bounds of prudence; when a man gives you all that you go after, why come back?

Don't harangue a mob; tell your story to some one intelligent person; the mob will follow the intelligent man.

Don't tell a story that will not attract the notice of the intelligent, nor forget that the same story will be as Greek to the ears of the mob.

Don't overlook the pleasure that follows if the chauffeur belongs to the class who keep automobiles in good working order; the saving in dollars is but a small part of the advantage.

Don't assume that your automobile will keep well just because you run it into the garage and keep it there for the Winter; that persistent agent of destruction, rust, may be a very busy pest; it might be like planting the automobile in a grave.

Don't use your garage for a grave; a hole in the ground is cheaper; the garage might then be available as a chicken coop.

Don't put a car up for the Winter without first preparing it for its long hibernation.

Don't assume that it is a mere matter of running off the water and emptying out the gasoline tank.

Inferior Terminology

No Truth in the Claim That a Cooling System Is Thermosyphon in the Absence of Water Pump

PERHAPS it is too late to revise the most commonly used terms throughout the automobile industry, referring to those that do not adhere to accepted terminology. The word "Thermosyphon" as applied to cooling systems of the class which do not depend upon a water pump for the circulation of cooling fluid is misplaced. It is even a question of some doubt as to whether or not the compound term "heat circulation" would be descriptive of the process. The probabilities are that the circulation which takes place in a body of water, due to differences in temperature, would be far too feeble to accomplish the purpose. In some so-called thermosyphon systems steam forms over the surfaces of the combustion chamber of the cylinders of the motor, and this slug of steam rushes off through the constricted passageways of the piping toward the atmosphere entraining water, thus setting up circulation. The vigorousness of this form of circulation is equal to that of a designed water pump. It would be within the realm of reason to hold that these slugs of steam are to all intents and purposes the very equivalent of the piston in a water pump, and they do the same work. It is doubtless true that a process of molecular segregation goes on; the molecules of water that are most affected by heat expand, thus lowering the specific gravity as compared with the same property of the water in the colder strata, and a process of equalization goes on, due to the circulating influence of the shifting molecules within the body of the water. But this feeble force for circulating purposes is a bagatelle as compared with the projectile-like ravages of a slug of steam, holding in its makeup a large amount of energy, by means of which it is impelled like a meteor from the place of formation to the point of escape to a lower pressure. The lower pressure is, of course, the outside atmosphere, and the overflow of the radiator is the gate to which the steam is directed in its passageway, and it is the problem of the designer to take advantage of the force of the steam so formed, but to dissolve the same in the water ere it reaches the atmosphere outside.

It Stands to Reason

JUST A FEW OF THE POINTS THAT SHOULD BE SELF-EVIDENT TO THE THINKING AUTOMOBILIST; THAT SHOULD NOT BE UNKNOWN TO THE THINKING BUILDER

That tires will not last long if the inner tubes are not of the right size; this class of trouble lost a race for one of the contestants for the Grand Prize at Savannah.

That the inner tubes will give out if they are too small, for then the rubber structure will be stretched too much.

That the inner tube will be quickly destroyed if it is too large, for then it will lap over and crack at the seam.

That the inner tube will be destroyed if it sticks (adheres) to the shoe.

That the inner tube will adhere to the show if it is not lubricated.

That lubricant for rubber is not the same as the lubricant used in metal bearings; for rubber, use soapstone; for metal, use mineral oil.

That sprinkling soapstone into the outer shoe just before putting the inner tube in place is not lubricating the tube.

That the soapstone must be rubbed all over the surfaces of the inner tube before it is placed in the shoe; a heap of material in the shoe may be damaging.

That care must be taken not to allow dirt from the roadway to contact with the inner tube; a $2 duster, laid upon the ground every time, will save several $10 inner tubes, and, perhaps, an outer shoe as well.

That a power pump to inflate the tires is of no value unless the air valves of the inner tube are in good order.

That putting up with defective air valves is poor economy; they cost but a few cents each—keep a few in the kit.

That tire valves should be covered with dust caps.

That good tires and care in putting them on is like spilling water into the ocean if a good tire pump is not available to use in pumping them up.

That a good tire pump is of little value unless there is some means at hand to tell the pressure.

That guessing at the tire pressure is like dreaming about how much gold there is in the vaults of the Bank of England.

That pumping up to a given pressure for all the tires is not good practice, unless attention is given to the effect of the given pressure on each of the tires—some tires have to be pumped up a little higher than others.

That good ignition equipment must be used if the motor is to deliver its proper quota of power.

That temperature, as it obtains in Winter and Summer weather, is never so severe as to alter the magnetic qualities of the permanent magnets of the magneto.

That temperature does affect the carbureter because the viscosity of gasoline changes with the temperature.

That the ignition is more or less efficacious as the fuel is well or ill proportioned.

That Winter's service demands a larger opening of the nozzle orifice of the carbureter than will be required in the Summer time unless some scheme is employed to maintain the fuel at a constant temperature.

That the fuel must be held at a constant temperature as it spirts out of the nozzle of the carbureter to avail anything from the point of view of a constant flow.

That temperature affects the battery, when one is used for the source of electricity, reducing the voltage, or the output, as the temperature is lowered.

That lead-lead storage batteries should be kept at a constant temperature to obtain the best result.

That the highest efficiency of the battery is at about 90 degrees Fahrenheit.

That poor ignition service is to be expected unless all the joints of the electrical system are soldered.

That makers of automobiles should see to it that all the joints of the electrical system are soldered before the automobiles are delivered.

That an accumulation of stale lubricating oil may not spell trouble until the temperature falls low enough to make it into a rock.

That a clean automobile is the least likely to give trouble in cold weather.

That an automobile may be too dirty to run and still look as spick and span as a 4-year old.

That a dash of attar of roses will not serve as a counter-odor for an automobile; what it needs is cleaning; get rid of the old lubricant.

That wheezing is a sign of defectively packed joints; replace the packing.

That just a small leak in the intake manifold will throw the mixture out of balance and shut the motor down.

That a leak may be due to defectively packed joints.

That the intake manifold may have a flaw in it; the mixture will then be out of kilter; get it fixed.

That shellac will close up a porous intake manifold quite permanently; flow the shellac over the inner surfaces.

That the proper kind of lubricating oil for a clutch depends upon the design and construction.

Our Endless Production

The Horse Shows That No Dent Has Been Made In Natural Demand As Yet

The new census tells us that there are more horses and more horse value in the United States now than were found in the year 1900. With all allowance for the probability that values and chattels were skipped generously by the enumerators and concealed industriously by the proud but thrifty owners, the new finding still contains some valuable documentary evidence as between the bears and the bulls in automobile production. It has been almost forgotten that the automobile was to drive the horse out of work and into the zoos, as was so generally claimed before it could be proven. These days, when the steadily swelling number of satisfied owners of automobile trucks and delivery wagons has really proven that the horse eventually must give up its burdens, the lesson of the fact seems to be lost on those who view with alarm a production of 200,000 automobiles in one business year, and to be appreciated mainly by the men of large finance who are accustomed to build on the broad facts of national scope. The horses are still there. What more does the doubting banker of Thomastown want? He who has grown opulent not only through his ability and faith in his own community but mainly through the large and conspicuous fact, in which are enfolded thousands of grievous industrial and commercial sins as in a mantle of charitable generosity, to wit, that it is difficult for any sound industry to keep step, only, with the national expansion in a country whose demands for a useful or a pleasing article grows annually by a healthy birthrate increase of the population exceeding 2 1-2 per cent., and in addition by an equal increase from the influx of immigrants, from whose labor somebody derives a profit, so long as all are working. In this bountiful situation the question of production remains serenely, How rather than How Many?

Classifying Carelessness

Meager Statistics Used to Classify Causes of Tire Trouble

RULES for use in "bucking" the stock market do not always prevent the players from getting their fingers burned, but they have a certain value to the man of skill and discrimination, so that if he must "take a flyer" he at least displays the good sense of utilizing available information for what it is worth. The same idea should have some value from the point of view of the automobilist who finds himself struggling with a large tire bill. Crude statistics are responsible for the classification of these troubles, as follows:

CAUSES OF TIRE CASUALTIES GIVEN IN PER CENT.

Assignable Causes	Shoes	Tubes
Reasonable wear and tear	37.1	43.7
Insufficient inflation	17.3	6.8
Punctures	29.4	7.2
Bruising	4.9	9.5
Surface blemishes	4.3	5.8
Rusted rims	3.5	..
Creeping	1.5	..
Blow-outs	1.8	..
Decomposition	0.2	..
Nipping	..	13.0
Unassigned	..	14.0
Total	100	100

Limiting Tire Depreciation

All Other Conditions Remaining Equal, Speed Is Disastrous

HAVING purchased the best tires possible to obtain for a given automobile, making sure that the sizes are large enough to sustain under the load without flexure, observing that they are fully inflated, keeping them out of contact with lubricating oil and other rotting substances, maintaining the surfaces intact in order that water will not be the carrier of mildew into the fabric, there still remains a considerable opportunity to destroy the tires before they will have rendered sufficient service to pronounce them satisfactory.

The speed maniac may be equally described as a tire destroyer. It is speed that does it. A given set of tires on a given automobile will last four times as many miles at 20 miles per hour as they will at 40 miles per hour. Putting it another way, the mileage of a tire is approximately inversely proportional to the square of the speed of the car. In operating an automobile, the average speed of traveling, considering a distance of, say, 1,000 miles of the total effort, does not exceed 18 miles per hour; this is in the face of the fact that autoists drive at a much higher speed for a part of the time, but it is not believed that they fall below this level for an equal part of the time. What really happens, is, that for all the time gained at the higher speeds, there is an offsetting period of inactivity which does not help to sustain the average speed.

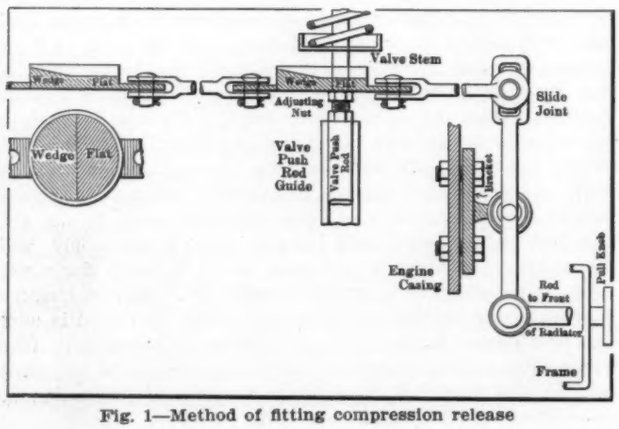


Fig. 1—Method of fitting compression release

Letters from Subscribers

High Compression Causes Difficult Starting

Editor THE AUTOMOBILE:

[2,434]—I have a car fitted with an engine with a five-inch bore and 5 1-2-inch stroke and find it very difficult to start, particularly in cold weather or when the engine has not been run for several hours, owing more to the fact that the compression is high and therefore difficult to swing. There is no compression release fitted, which makes matters worse. I have tried putting gasoline into the cylinders and after a few pulls it will start, but the difficulty is to crank sufficiently fast for the low-tension magneto. I find it more difficult to crank with the compression cocks open. What would you suggest to overcome the difficulty?

Buffalo, N. Y. F. C. RICE.

The difficulty with your car is that it should have been fitted with a compression release. To fit an internal release is a matter that we cannot suggest, as it involves a new camshaft and quite a lot of alterations. The simple compression release shown in Fig. 1 could be fitted to almost any motor. It consists of inserts placed under the valve stems in such a way that when the motor is running the flat surface only is in contact. The engine is started by pulling out a rod in front of the car near the starting crank; the wedge-shaped part of the insert raises the exhaust valves slightly, which will permit of giving the engine a good "swing." The insert should be hardened.

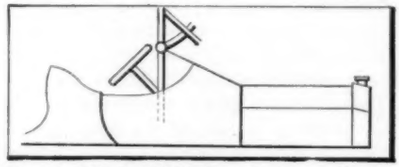


Fig. 2—Wind shield for small runabouts with scuttle dashes

Patches That Do Not Stick

Editor THE AUTOMOBILE:

[2,435]—I have just returned from a tour, and although somewhat inexperienced I had no trouble with any part of the car but the tires. The less I say about them the better, as I could fill your paper with my troubles. But they say that practice makes perfect, and I now see that a good deal of my trouble was of my own making. There is one thing, however, that I cannot manage, viz., putting patches on punctures and making them stick on. Everything seems good when I put the tube in the tire, but after a few miles the two part company. The trouble I have is to make the patch stay on the tube, as it always has a tendency to curl at the sides. I have greatly profited by your recent articles on tires and will be greatly obliged if you can help me. TIRED.

Savannah, Ga.

Your difficulty seems to lay in two things: First, you do not allow the solution to become tacky, and this takes from 10 minutes to a quarter of an hour by the watch, and not guesswork; secondly, you should have some means of keeping the tube and the patch pressed together, and such a tool as shown in Fig. 3 would answer. It consists of two pieces of hardwood and a clamp that can be purchased at any hardware store. Leave the tube in the press about ten minutes, first lightly powdering the boards to prevent the patch from sticking to them.

Heat inside the tire is generated by friction and to overcome this liberally cover the tube with French chalk before inserting it again and pumping it up to the proper pressure.

THIS DEPARTMENT IS DEVOTED TO THE ANSWERING OF LETTERS FROM SUBSCRIBERS ON ANY SUBJECT RELATED TO THE RUNNING OF AUTOMOBILES

Weight of Woods for Aeroplanes

Editor THE AUTOMOBILE:

[2,436]—Could you give me the weight in pounds per cubic foot of the following woods: Ash, beech, elm, oak, sycamore, willow, together with any remarks on them as to their properties?

Ash weighs 50 pounds per cubic foot and is very elastic and withstands weather conditions well. Beech weighs 42.12 pounds and the white variety admits of thin divisions. Wych elm weighs 35.62, and is suitable for steam bending. Rock elm weighs more than wych, viz., 41.93 pounds per foot cube, but is closer grained and better to work. Oak weighs 54.50 and is durable in exposure to weather; on account of the tannin in oak it must not be used in contact with iron. Sycamore weighs 38.90 pounds per foot cube and willow 30.37 pounds. The latter is often used for friction plates and brake blocks.

An Inexpensive Wind Shield

Editor THE AUTOMOBILE:

[2,437]—I have a racing runabout with a metal scuttle dash and I wish to fit a wind shield. I tried one fitted to the dash, and it was worse than useless, as to be of any service it had to be high, offering a large area for wind resistance. If it were possible I should like it so designed that I will be able to lift it and see underneath when it rains.

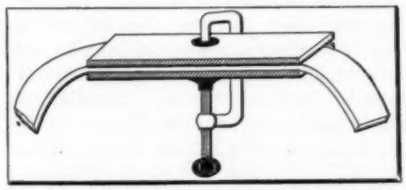


Fig. 3—A tool that every autoist should carry—two pieces of wood and a clamp

York, Pa. H. P. S.

Such a shield as you require we have sketched in Fig. 2. As you say the car is fitted with a scuttle we presume there are front doors and enclosed sides and to these the upright can be fitted. From the upright to the dash we suggest that you fit a piece of leather that can be removed and make the frame carrying the glass hinge at the top. The bottom of the frame should be fitted with bolts and thumb-nuts which will grip on the semi-circular guides. If you have a top fitted, raise this when you are measuring the height of the shield.

"Which Wire?"

Editor THE AUTOMOBILE:

[2,438]—I have a fleet of motor cabs running, and what I find gives the men more trouble than anything else is the ignition wiring. There are two separate sets of plugs connected to magneto and coil ignitions, and the men, when anything happens, often remain stranded owing to want of knowledge as to which wire to put to the proper terminal. Could you give me any suggestion as a remedy?

New York. A SUBSCRIBER.

The best method we can suggest is to mark the terminals with different colored paints, thereby making the matter of matching simplicity itself and doing away with any possibility of making mistakes. The valve caps into which the spark plugs are screwed should be painted as indicated in Fig. 4, and each wire so colored that it can be traced from spark plug to magneto or distributor with ease.

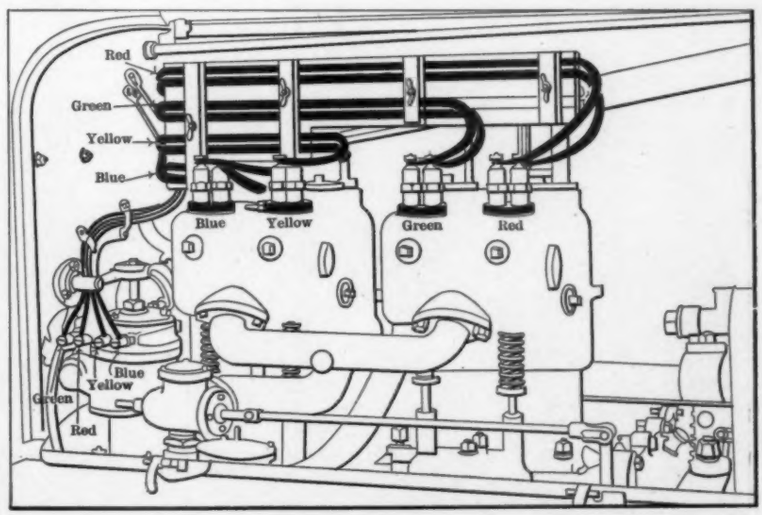


Fig. 4—Method of painting wires to facilitate finding the proper wire

Slush in the Cooler

Water Has a Definite Freezing Temperature; Non-freezing Solutions Are Not So Definite

WATER freezes at 32 degrees Fahrenheit, under a pressure of one atmosphere, and as long as there is any water present the temperature will hold at the point of freezing, or melting, as the case may be. In dealing with water, this definiteness is advantageous. Upon adding ingredients which in themselves have a lower congealing point, they influence the freezing point of the whole, dragging it down to a lower level. It is also true of glycerine, alcohol, calcium-chloride, etc., that when added to water to make a non-freezing solution, they destroy the sharp line of freezing distinction, and instead of making a solid at some definite temperature, the product is more in the nature of "slush," a good example of which is to be found in the characteristics of ice cream. This slushing property may be taken into account advantageously. In making a non-freezing solution, the more of the foreign substance that is added, the lower will be the specific heat of the mixture as a whole, to which must be ascribed the reduced efficiency of the solution for cooling purposes. Under the circumstances, it is wise to add as little as possible of the glycerine, or alcohol, as the case may be, to attain the end, and the fact that slush forms, rather than a homogeneous body, makes it possible to limit the quantity of the foreign material to be added, knowing that while the lowest winter temperature may produce freezing, it is not likely to result in a homogeneous solid body.

Value of Graphite

Automobilists Will Profit by Its Use as Here Indicated

IT has been found that if finely powdered flake graphite is put into the crankcase in the proportions of a teaspoonful to a quart of lubricating oil the engine runs more smoothly, there is better regulation and compression is much improved. The following uses for flake graphite about the automobile are suggested:

Introduce flake graphite between the leaves of the springs. This may be done by jacking up the car so that the chassis hangs by the springs, then flake graphite and oil mixed to the consistency of a thick paste may be introduced between the leaves and the squeak will be cured for practically all time.

If the valve seats and stems are polished with flake graphite a free and easy movement is assured.

As a General Rule—

If an inventor is awarded a patent, an infringer will be found for it.

If a patent is allowed, it is fairly well understood to be a license for a lawsuit.

If the inventor ever reaps a profit, he may consider himself fortunate.

If the invention is valueless it will not be copied.

If the invention proves to be an epoch making discovery there will an army of copyists.

If the inventor is wise he will exact cash from the purchaser.

If the inventor takes a note in payment it will be no good.

If the purchaser can negotiate a transfer for a note or a promise, he will do so.

If the inventor goes to law he will find it the shortest road to the poor house.

If the inventor has any other way of making a living, it will be worth his while to practice it.

If "Colonel Sellers" made all the money he hoped to, there would be no more left in the world.

Carbureter Action

BEING AN ABRIDGMENT OF A PAPER READ BEFORE THE BRITISH INCORPORATED INSTITUTION OF AUTOMOBILE ENGINEERS, BY W. MORGAN, B.SC., AND E. B. WOOD, M.A (CANTAB.) (SECOND INSTALLMENT)

VARIATION of cross-section of throat modifies the suction on the jet for equal deliveries of air and consequently modifies the carbureter characteristic. Bushes of the following diameters were used with the same jet: A, 1 1-4 inches; B, 1 inch; C, 3-4 inch, and D, 1-2 inch.

These varying velocities past the jet affect both the slope of the characteristic and the point of intersection on the air axis (see Fig. 6). The characteristics converge toward a point on the petrol axis behind the air axis.

The droop from the straight line appears to a greater or less extent on every curve taken. Fig. 7 gives the characteristics obtained with tubes A, B, C, at 500 revolutions per minute. It is seen that the maximum quantity of air per minute with A and B is the same, the curve of the droop in the case of B being slightly the flatter. In the case of C the droop is still less pronounced. Measured in percentage deviation from the straight line relationship the droops are: A, 23; B, 7, and C, 5.

The engine in cases A and B has nearly reached the maximum intake of air with half-open throttle, so that further throttle opening serves to enrich the fuel mixture without grealy increasing the quantity of air taken.

Strongly marked oscillations of pressure occur in the induction pipe of an engine due to resurgence on the opening of the inlet valves and to inertia effects generally. These same effects will occur in the partially throttled pipe, but the pressure variations will be damped by the high gas velocities at the partly closed throttle. On opening the throttle lower gas velocities are obtained with less and less damping action so that the surges of gas are more strongly felt at the jet. With open throttle this surging can be so strong as to carry petrol outward from the induction pipe. The result is that a unit volume of air in surging flow induces a larger quantity of petrol than the same volume in steady flow.

It has been suggested that the high gas velocities in a partly closed throttle serve to damp the surging. The same would be true of high velocities around the jet and this conclusion is borne out by the smaller droop observed with throat C. The authors made efforts to wipe out this droop by inserting silencers of various types between the engine and the jet with quite satisfactory results. Care was taken that a silencer was used which offered no serious resistance to the passage of air. Fig. 8 is the graph obtained with a silenced carbureter using high velocities round the jet.

Without this droop the characteristic of a plain-tube carbureter for all speeds and throttle positions would be a straight line graph. The droop for wide-open throttle positions causes the graphs for successive speed to cover a wedge-shaped area, so that with the same delivery of air various quantities of petrol may be obtained. It should be noticed that this variation is more apparent than real, for in the examples shown, up to 0.8 of the maximum air delivery possible at any speed the characteristic lies on the straight line.

The cause of the droop in the carbureter curve has been stated to be resurgence in the induction pipe which makes itself seriously felt when the throttle is wide open. It may be urged that the droop may be caused by a change in the type of air flow set up at certain conditions of velocity and throat area. If this were so it would be expected that the characteristics obtained at different speeds with the same bush would all show the graph falling from the straight line at the same point. Reference to the superimposed curves obtained with the same bush at speeds of 300, 500 and 900 revolutions per minute (Fig. 3) shows that the droop begins to be apparent at points indicating different velocities with different speeds.

Variation in back pressure may be expected to affect the characteristic, for, in general, the pressure in the cylinder, on the opening of the inlet valve is greater than that in the induction pipe, so that a rush out of the cylinder takes place, setting up surging (see Fig. 1). This effect will be the greater, the greater the back pressure, and as a consequence it may be expected that

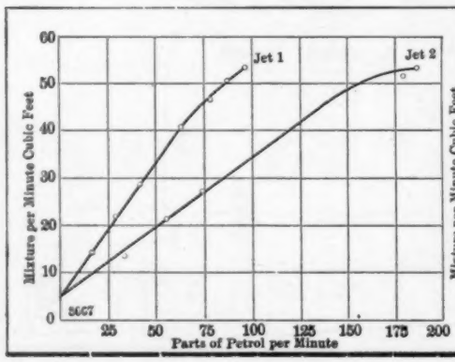


Fig. 5—Curves plotted from tests on jets of different sizes

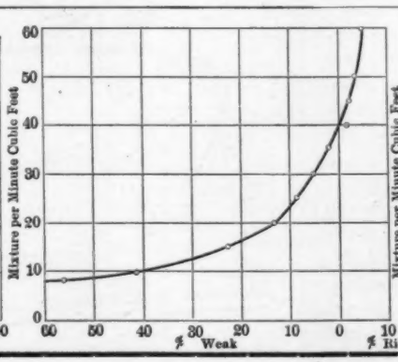


Fig. 4—Percentage variation of mixture strength

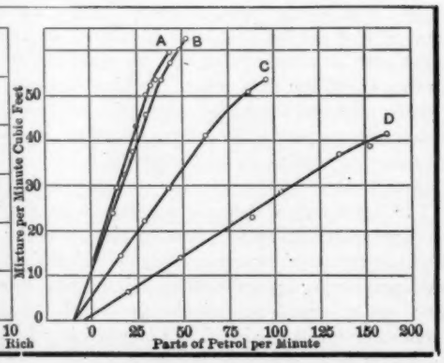


Fig. 6—Effect of varying sizes of choke tubes

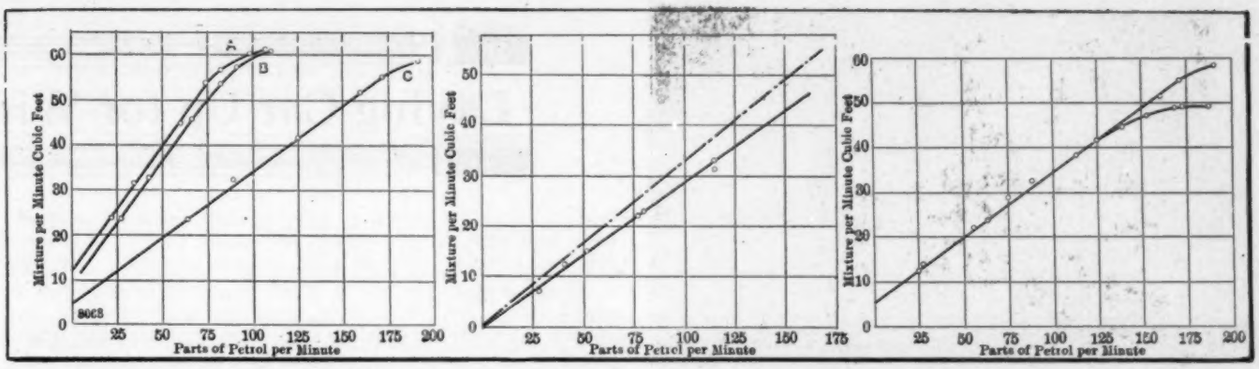


Fig. 7—Obtained with three sizes of choke tube at 500 r.p.m.

Fig. 8—This graph was obtained with a "silenced" carbureter

Fig. 9—The results of back pressure are plotted here

other things being equal a high back pressure will give a carbureter characteristic with a greater droop than that obtained with a low back pressure. This is brought out in Fig. 9, which shows characteristics obtained with normal back pressure and with a pressure of 5 pounds per square inch.

The adjustable tappets on the valve lifters of the engine were removed first from the two back cylinders, leaving the two front ones in action. Afterward the third cylinder tappets were removed. In this way characteristics were obtained with two cylinders and with one cylinder in action. The type of characteristic remains unchanged.

The characteristic of a plain-tube carbureter for all speeds has been shown to be a straight line (neglecting droop). The slope of this graph may be varied to any degree by selecting a suitable jet. Let the jet be adjusted so that in a given plain-tube carbureter the characteristic lies parallel with the ideal line. The mixture delivered is now weak all along the line, very weak at first, and becoming very nearly correct for large consumptions of air. Another way of stating this is to say that in such a plain-tube carbureter there is a constant shortage of the delivery of the liquid. This being so, the designing of a constant mixture carbureter is possible; allow the constant shortage to dribble into the induction pipe and the problem is solved, except for questions of convenience. The droop on the characteristic for any given speed does not necessarily lead to waste of petrol, for the graph may be set so that the terminal points of the characteristics are parallel to the ideal line; a suitable constant supply then enables the ideal mixture to be obtained at all open throttle positions. At intermediate throttle positions the mixture would be weak, but if the statement be accepted that such weak mixtures are economical this would be a desirable feature. In any event when maximum torque was required at any speed the required mixture could be obtained by fully opening the throttle; with throttled positions maximum torque is obviously not required and some weakness of mixture would not be felt.

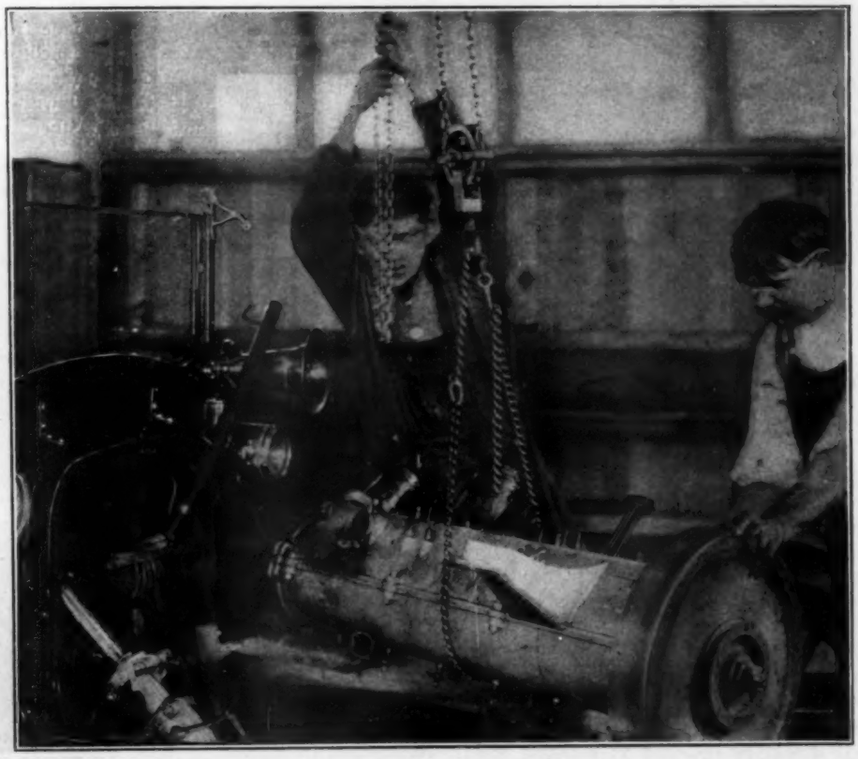
To sum up, there appears to be no necessity in any carbureter for extra air devices or the multitudinous contraptions employed other than a neat form of apparatus for supplying this constant extra supply of petrol.

It may be objected that the foregoing results have been obtained under conditions which do not occur in practice. This is true, and to estimate the effect of actual running conditions in modifying the characteristics obtained by driving the engine by an electric motor, measurements of air and petrol consumption have been taken with the engine running under its own power. The apparatus employed was the same, except that the electric motor was cut out and replaced by a rope brake. The engine speed was held constant for various throttle openings by varying the load on the brake. The results obtained bore out those obtained by driving the engine by an electric motor.

Lifting Out the Motor

Illustrating the Use of a Chain Hoist in the Repair Shop

NEXT to a file or a hack-saw the chain hoist ranks in importance in the repair shop; it comes in when units are to be lifted out of the chassis, as shown in the illustration, and, in many tight corners, it is worth more than a half dozen men. All that is required is the hoist, capable of lifting anything up to two tons, and a sling, so that while one man puts his weight on the whip end of the chain hoist, the other man steadies the work.



Illustrating the use of a chain hoist, showing how the motor base, in this example, is slung, permitting one man to lift the weight while the other steadies it

Fig. 1—Care should be taken to see that the cover is either held to the ground or tacked thereto

Laying Car Up for Winter

IT is not always because the owner does not care for driving in inclement and cold weather that the car is laid up for the Winter. Health, business and the putting of a closed car into use necessitate the open car being stored, and the owner will do well to remember that a great deal of trouble can be saved at any future time that the open car is put in service if the autoist will see that the following instructions are properly carried out. There is nothing that will depreciate the quality of a car sooner than allowing it to lay idle and unprotected for any length of time, except, perhaps, abuse; and it is for this reason that a doctor's car runs better than most cars of the same make, as he, above everybody, has to keep his car in running order, and consistent running without rough usage keeps everything in trim.

Appearance has a lot to do with it, for when appearance has to be studied the car is sure to be properly looked after, preventing filthy accumulations of oil, grease and mud.

Tires.—Place the car where it can remain without having to be moved and with some suitable means jack the wheels up and remove all the tires. Fig. 4 shows how the front wheels can be lifted by placing the jack under the center of the axle and inserting blocks of wood B1 and B2 under the spring clips. The wheels U1 and U2 may have to be turned to allow the block B1 clearing the steering arm. The rims should be looked over to see if any dents are present and these should be remedied; clean off with emery paper any rust that may be on them, and then paint the insides with aluminum or any other suitable paint to prevent them rusting while being stored. The tires should be thoroughly overhauled and all small holes cleaned out with gasoline and a pointed instrument to remove dirt and small stones, and if there are any large cuts and the autoist is not in a position to do vulcanizing himself the tires should be sent to some tire shop to have such repairs made. The tubes should be wiped over with gasoline (using only a very small quantity) and slightly inflated, well-covered with French chalk inserted in the tires, of course after all vulcanizing that is necessary has been effected. Wrap them up in cloths and store in a dark damp place. Hang up on stout wooden pegs or lay them flat on shelves; never hang tires on nails.

Body.—This should be lifted about 2 inches for the better access to the chassis. It is usually accomplished by loosening six bolts that attach it to the side members of the frame. All dirt and oil should be removed by scraping and washing. If pleated leather upholstery is fitted, introduce a wet leather between the folds to extricate dust and afterward dry off with a clean, soft rag. The white of an egg painted on with a brush will give the leather a renewed luster; this can be done when putting the car into commission again. If the cushions show signs of sagging they should be taken apart and the springs looked over and the hair restuffed. The paint work should be gone over with a renovator such as can be obtained at any coach-builder's store.

Chassis.—As above stated, to thoroughly overhaul the chassis the body must be lifted. The amount of dirt and oil that cakes everywhere in the parts covered by the body is surprising. Clean all foreign matter off with kerosene and a stiff brush, and rub with fine emery paper moistened with kerosene any metal parts that have become rusty. The latter facilitates the work and gives a smooth finish, and to prevent a reoccurrence the parts could be treated with paint; or if they are to remain bright, cover them with some thick oil, such as is used for rear axles; it is better than grease and easier to remove. Go over all nuts to see that they are tight, and if there are any missing replace them and renew any bolts that are worn.

Wheels.—Remove these; clean journals and ball races with kerosene and repack with grease or thick oil; if there is any play, which can be ascertained by shaking the wheels sideways, this should be taken up before the wheels are replaced.

Springs.—It would be as well to take the springs off, if the car has been in use for any length of time, in order to scrape the rust from between the leaves; otherwise jack the frame up, as shown in Fig. 2, when the weight of the axles and wheels will cause the leaves P1, P2, P3, P4 to separate and grease can be introduced with a flat knife, T1. If the leaves do not come apart easily prize open with a screw driver. Spring bolts and shackles wear if not made from the proper material, and these should be taken out, cleaned with emery paper and kerosene, oiled and replaced. If there are any grease holes drilled for grease cups, clean these out with some wire, so that when grease is again put through them there will be no impediment.

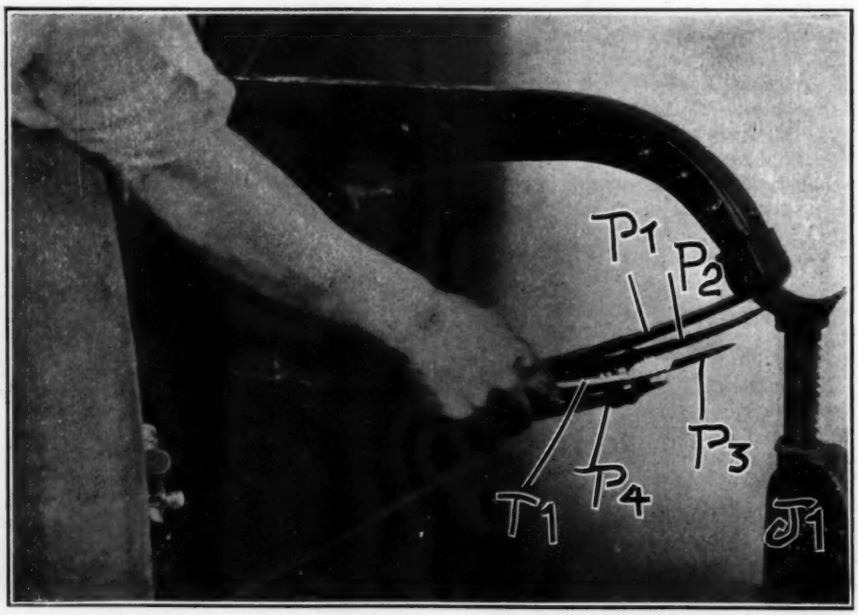


Fig. 2—Method of greasing springs that have been freed by the jack under the frame

PARTS OF THE AUTOMOBILE TAKEN SERIATIM; HOW EACH PART SHOULD BE TREATED TO PUT THE CAR OUT OF COMMISSION

Bolts.—There are different parts of the car where the threads of the bolts become rusted. They should be cleaned with a file cleaner brush, using a little kerosene and then oiled.

Lubricators and Pipes.—Wash all oil pipes with kerosene or gasoline; all grease cups should be cleaned out and refilled with fresh grease. Oil-containing tanks, lubricators and filters must be cleaned and gaskets put back, and if worn, replaced. Hammered lead makes a good joint and one that will not wear out.

Storage Batteries.—If the car is not to be used for more than two months, empty the acid, wash out with distilled water and fill with distilled water so that the plates are covered. Clean terminals from all sulphation and store in a dry place.

Magneto.—If the magneto is easily detached, remove, clean and store in a dry place.

Coil.—If the place where the car is to be stored is not perfectly dry, some rags wrapped round the box should keep this from damp.

Motor.—Grind in all valves; clean out all carbon; empty oil and flush with kerosene; clean distributor; clean off all dirt and oil with gasoline and kerosene and cover lightly with vaseline all bright parts. Better have all adjustments, repairs and overhauling to the motor done when the car is put away rather than wait for the Spring, when the repairers are busy.

Radiator and Water-Cooling System.—Empty all water; disconnect pump and engine and connect hose pipe to same, allowing a good stream of running water to pass through and clean out all impurities. Connect hose to outlet of water from radiator and run water so that it comes out of the filler. If the radiator is clogged with grease, steam will remove it.

Clutch.—If of the leather type, withdraw it and paint on some castor oil, first cleaning off with a little kerosene. Metal clutches should be washed out with kerosene and refilled with ordinary engine oil, allowing it to find its way between the plates by running the engine with the clutch out for a minute.

Gear and Transmission.—Thoroughly wash out with kerosene, using a syringe, refill with the lubricant usually employed.

Fig. 3—How a car should not be laid up. Dust will creep in under the cover and front tires will be useless in three months

Pass the hands through the lubricant that comes from the gear box to discover any bits of metal that may have come from the bearings or gearwheels. If any are found, don't be satisfied till you know whence they come and have the worn parts seen to.

Rear Axle.—If there is a cover or filler at the top and a drain plug at the bottom, flush out with kerosene and refill with heavy oil, looking also for metal parts.

All bright parts should be thoroughly polished and covered with thick oil or vaseline, the car jacked off the ground and covered completely with sheets so that dust is entirely excluded. This can be done by tacking the sheets to the floor if it is of wood or by placing strips of wood on concrete floors and tacking the sheets to them.

Empty all gasoline and see that the float is not punctured and the float chamber is free from dirt.

If a strainer is fitted, clean it out.

Heating the Garage

A Naked Flame in a Cooped-Up Garage Is a Short-Cut to a Fire

GENIUS, with all its versatility, has never succeeded in solving to the satisfaction of the prudent owner the heating problem in the small private garage. To the man who constructs a one-car garage in his back yard, there is offered the opportunity of trying to keep his automobile in commission in the Winter time, in the face of great difficulty. Insurance regulations require that the garage be located at a considerable distance from the residence, so that running a steam line from the furnace in the basement of the residence offers few attractions. Putting a stove in the garage is out of the question; even were it not in the nature of a fire hazard to do so, it would still remain for the owner to go to the garage at fixed and frequent intervals for the purpose of firing up. It has been suggested that gas be used for heating, placing a more or less automatic system in a small fire-proof "lean-to" adjacent to the garage, but separated by an impervious wall, so that inflammable mixture, should it break loose within the garage, would not be communicated to the naked flame of the heating apparatus. Even this solution is not available in half the private garages in the country because of the absence of illuminating gas. Electric lighting and heating is the obvious answer.

Fig. 4—Method of blocking up front axle to take the weight off the tires

Questions That Arise

SOME OF THOSE THAT COME UP IN EVERY-DAY AUTOMOBILING ARE ANSWERED BY THE MATTER WHICH IS BEING PREPARED BY FOREST R. JONES IN THE NEW EDITION OF THE "AUTOMOBILE CATECHISM" THAT WILL SOON GO TO PRESS

[284]—How is vulcanizing done when repairing a tire?

After the patch is put on, it is heated to a temperature of about 250 degrees Fahrenheit or slightly hotter, for a length of time which depends on the amount of rubber that has to be heated. More volume of rubber must be heated when vulcanizing the patch on a tire-shoe than on the inner tube. It is not generally necessary to apply full temperature more than fifteen minutes.

Specially prepared sheet rubber and rubber cement in paste form are generally used for vulcanized tire repairs. A patch is put on in practically the same manner as in the preceding question, and then vulcanized.

Numerous forms of vulcanizers for repair purposes are on the market. The means of heating them is generally electricity, steam, gas or gasoline. A thermometer or a steam gauge often forms part of the vulcanizer. The steam pressure in the vulcanizer corresponds to a known temperature; thus, a steam pressure of thirty pounds per square inch by gauge corresponds to 250° Fahrenheit, and 45 pounds per square inch by gauge corresponds to about 275° Fahrenheit. The latter temperature is used on heavy tire-shoes.

The rubber is easily injured by overheating. Care must be exercised to prevent the vulcanizer from becoming too hot. Some electric vulcanizers are provided with automatic cut-outs, which turn off the current at the temperature to which they are adjusted.

It is advisable to experiment on some rubber which is not valuable before attempting to repair a tire.

[285]—Before putting a tire shoe on a rim, what should be done?

Clean the rim thoroughly where the tire touches it. Scrape and file off all rust and dirt. The edges of the clinch should be carefully smoothed with a file to remove roughness. The file should be fine cut so as not to leave ridges and points; clean well under the clinch.

[286]—What injury is almost certain to result by running with a tire too soft (insufficiently inflated)?

Rimcutting of the tire where the clinch of the rim bears against it. The rimcutting occurs in the groove between the bead and body of the tire.

[287]—If a tire is run completely deflated, what injury is apt to occur?

If there are tire lugs they are liable to tear the shoe and cut the tube.

When there are no tire lugs the shoe may creep around and cause the tube to pull so hard on its valve as to tear the tube at the valve.

Rimcutting is almost certain to occur in either case.

[288]—A tire that is badly worn on the tread can be repaired in what manner?

By retreading. The tire should be carefully examined, especially for rimcutting, to determine whether it is worth retreading.

[289]—How can a tire shoe that has a rather large hole through it be run?

By putting a protective lining canvas plaster inside of it and a protector outside. The latter is generally laced on; it is usually made of rubber-covered fabric or of leather, as found on the market. The patch, or lining, for the inside of the shoe is usually made of rubber-covered fabric. It is covered with adhesive rubber on the side intended to go against the inside of the shoe. Some internal patches are made to extend under the clinch of the rim.

When putting a protector over a tire shoe, the tire should be first partly inflated, say to almost 15 pounds per square inch, and the protector then laced on. Then, when the tire is fully inflated, the protector will be tight in place.

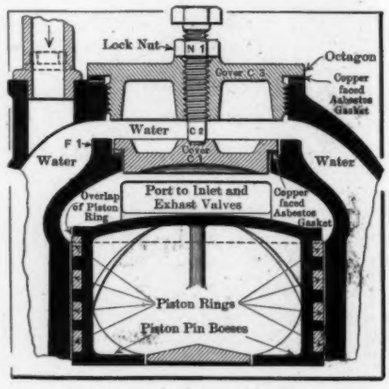
[290]—In case of a large hole, such as a blow-out, in a tire shoe, how can it be repaired?

By separating the layers of the fabric and inserting other fabric between them. The tire must be afterward covered with plastic rubber compound at the patch, and vulcanized. It is work for an expert.

Cylinder Refinements

Showing How the Questions of Expansion Are Cared For, and Other Details

NOTHING can be of greater importance than the details of design of the cylinders of a motor, nor is it possible to conclude from the evidence at hand that these matters are receiving all the attention that they deserve. The illustration here given of the upper end of a cylinder will be used to show how the inner cover may be held in place in such a way as to allow for a certain amount of expansion, it being true that the differences in temperature between cycles are so great that it is necessary to make some provision in order to abort leakage. In this example the dome of the combustion chamber is "cored" for a liberally sized opening and strength is obtained around the cored hole by means of the upward turned flanging F1, with a depression for the cover C1 to fit into, allowing for the copper faced gasket in the manner as shown. The cover C1 is held firmly in place by means of the capscrew C2, the latter being threaded through the cover C3, with a lock nut N1, which, when screwed down, prevents the cap screw from backing off. The cover C3, in turn, is screwed into the water jacket hole, which is also cored in the casting, leaving a large opening for the gases to escape during the casting process, thus assuring that the castings will be sound if the metal is of a good quality and the foundry work is well executed. Within the combustion chamber the surface is as nearly spherical as it is possible to make it, all things considered, and this conformation has the advantage of limiting the inner surface to the minimum, reducing the quantity of heat which will be permitted to pass through into the water that circulates in the jacket. The bore of the cylinder is countersunk at a point so located that the top piston ring will overlap as shown, the idea being to abort burrowing of the piston ring at the point of "dwell" of the piston at the top of the stroke. For the rest, let it be observed that the cylinder walls are of uniform thickness, the idea being to prevent the metal from cooling faster at one point than at another, and the piston is also of uniform thickness for the same purpose.



Section of a cylinder showing the covers are fastened to prevent heating trouble

Digest

EXTRACTS FROM CONTINENTAL PERIODICALS DEALING WITH SUBJECTS ALLIED TO AUTOMOBILE ENGINEERING—COST DATA ON SALT BATHS—SEPARATION OF SHAVINGS—ALTITUDE RECORDS, ETC.

Metallic and Salt Baths for Uniform Heating in the Hardening of Steel Parts—For temperatures from 650° to 700° C lead may be used. Beween 700° and 900° chloride of sodium (common salt) is available, but a mixture of chloride of potash and chloride of barium is the best medium so far found. This mixture has the advantage over common salt that it evaporates much less and does not spatter during the melting. The work and tools take a thin coating from the bath which obviates oxidation in the air, and in the water this coating cracks off, leaving the parts clean and white as silver. At the Deutz gas motor factory the bath is heated in steel crucibles, which have proven more lasting than clay or graphite pots. The bath may be heated by water gas, illuminating gas, producer gas, oil or electric furnace. For normal hardening, taking place at about 800°, producer gas gives the most economical results, especially where a number of hardening ovens are run at the same time or where the producer gas is also used for power purposes. For temperatures above 1,000°, as for high-speed steel, the gas flame oven with boxed inserts is most suitable. The cost of the different methods applied to identical work compares as follows: An electric hardening oven, 300 by 300 by 370 millimeters inside measure, uses at 800° C. at least 18 kilowatts of energy per hour, which at 20 pfennig per kilowatt brings the hour cost to 3.66 mark. A gas oven of 300 millimeters inside diameter and 450 millimeters deep uses per hour 9 cubic meters of illuminating gas. which at 12 pfennig per cubic meter brings the cost to 1.08 mark. The hourly consumption of producer gas amounts to about 50 cubic meters at 0.8 pfennig per cubic meter and this reduces the total cost to 0.40 mark, including fuel, work, amortization of investment and interest. Oil of 1,000 heat units (1 B.T.U. equals 0.252 German heat units), and costing 10 mark per 100 kilograms, brings the cost for fuel under the same circumstances to 0.55 mark.—Communication from Deutz Gasmotoren to *Werkstatts-Technik*.

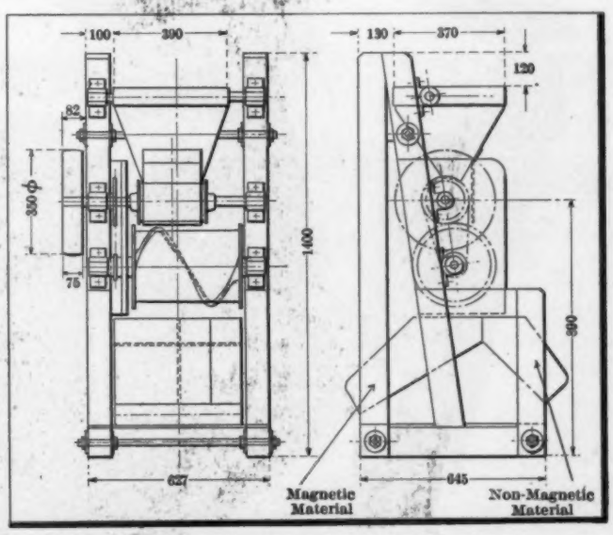
To utilize commercially the brass, bronze, iron and steel shravings which result from mechanical operations in factories where both classes of metals are worked it is necessary that there should be no admixture of iron or steel in the more valuable metals, but only in factories of the largest size is it practicable to work the different metals with different machine tools and in different locations. Hence it has become an economical necessity to perfect apparatus for separating the shavings and the electromagnet has naturally become the means for so doing. In *Werkstatts-Technik* for September several suitable machines intended for this work under different conditions, as these arise in different industries, are described and illustrated. At the same time the Siemens-Schuckert Werke of Berlin offers in the open market the separator shown in the accompanying illustration and two other types, one smaller and one considerably larger capable of separating about 800 kilograms per hour. These are operated with direct current of 140 to 500 volts and the magnets are arranged for tensions of 75 volts for each spool.

The material is placed in the hopper, made of sheet zinc and passes from the bronze feed roller in small quantities to the separator drum which is driven from a transmission mechanism or from a separate motor with clutch. The power required for a machine of the dimensions illustrated is 1-2 horsepower. For the larger machine 3-4 horsepower is needed. The brazen separator drum contains in its interior the stationary electromagnet of the usual shape, which holds all iron parts coming from the feed roller. By means of the spiral rib on the rotating drum the material which is attracted by the magnet is shoved to the end of the drum, where it is no longer under the magnetic influence and drops into the receiver for ferrous material. The drum makes 30 to 40 revolutions per minute, according to the kind of material to be sorted. The frame of the apparatus is made of wood to avoid magnetization. In the dimensions illustrated—the numerals denoting millimeters—the capacity is about 400 kilograms per hour provided the brass shavings contain about 5 per cent. of iron parts. With higher iron content the capacity is reduced, as in that case it is necessary to let the material pass more than once through the machine. The efficiency is also determined by the amount of moisture in the shavings and the amount of rust which has been formed, as when the shavings are allowed to accumulate under the machine tools subject to constant wetting from the soap water. Best results are obtained by sorting only dry material, but a special type of machine is constructed for handling grainy or pulpy masses and for separating iron pieces from molding sand or slag.

Methods for determining altitude by barometer and instrumental observation are described by Commandant Paul Renard. The accuracy of the barometric record depends very largely on comparison of the barograph reading with that of an ordinary scientific barometer before the barograph is sent up so that the daily and local variations in barometric pressure may be taken into account. True accuracy requires rather elaborate calculations which in the case of aeronautic exploits agree badly with the public's demands for immediate statements.—*Revue Scientifique*, September 17.

Just What Automobiles Do to Roads—In order to settle the vexing question as to the injury done to macadamized roads by the action of rapidly revolving automobile wheels, the War Department of France has set aside the road from Champigny to Quene-en-Brie for a series of practical tests to be begun at once.—*Bulletin Officiel*, September.

An Improvised Vise—When there is need of a vise at the roadside and none is available, it is usually possible to improvise one by placing the jack under one of the frame reaches and screwing it up until it holds the work tightly against the latter. To avoid scratching the frame reach, a piece of soft metal should preferably be put between.—*La Pratique*, October 10.



Scale sketch of German machine for separating steel from metal shavings—Figures denote millimeters

Care and Repair of Tires

TIRE LIFE DEPENDS UPON THE WAY A CAR IS DRIVEN, BUT ITS ULTIMATE LONGEVITY DEPENDS UPON PROPER INFLATION

TIRE experts, tire manufacturers, and any one with the slightest experience with tires, will agree that the pressure in tires must be sufficient to prevent flexure. Also, that a tire intended for a certain weight cannot under any circumstances be used on a car heavier than the weight for which it was intended without giving unnecessary trouble and being a source of expense to the owner. The matter is up to the manufacturer of the car, most people say, but the question of economy plays a great hand in the initial equipment. An inch in diameter or half an inch in width means the saving of thousands of dollars to a manufacturer of a quantity of cars, which means so much more profit. The blame after the car leaves his hands is not laid at his door, but at that of the tire maker. It rests with the buyers of cars to be more particular in seeing that the car has tires a half inch larger, rather than that there should be one-half inch more stroke to the engine, because, after all, what do the dimensions of an engine matter provided the result is there? The only way to obtain the result is to have tires of the proper dimensions and see that they are correctly inflated. This sounds very simple and the easiest thing on earth; and so it is, under certain circumstances. Water pressure affords a good illustration of the difference between hand-pumped tires and those inflated by mechanical means. As previously stated, CO_2 does not affect the life of a tire in a detrimental manner (this being the opinion of tire makers and those who have used this method of inflation for some time), consequently arguments against its use need to be backed with practical proof and not with hypothetical deductions. When water is wanted in a city all that is necessary is to turn on the tap and pay a small amount for water rate, which is equivalent to having a compressed air tank or other mechanical device. There are several good ones on the market. But suppose you live in the country and have to pump every drop of water several hundred feet up into a tank by hand, how often does it happen that the tank is dry just at the time you want water? What would you think of a man who had the water main passing in front of his door and could have it connected to his house at a small cost, but who persisted in using an old hand pump, unless it be that he preferred to do so for exercise sake or that the water of the well from which he derived his source of supply had particular advantages? Air is air, after all, and the only way to inflate a tire properly is by mechanical means if the pressure is to be maintained during its life. Autoists are divided into two classes—those who drive and look after the car themselves and those who employ a man—and where is the man yet born that will pump a tire to 100 pounds' pressure per square inch who can get along just as well with 80 pounds, provided it does not cost him anything by so doing? It is a well-known fact that some chauffeurs obtain a commission on tires, and it is to these gentlemen's benefit to underinflate rather than overinflate the tires. Try as hard as they can, they cannot do the latter with an ordinary hand pump, and the owner is surprised at the persistently large tire bill. The solution is to give the man the tools and see that he does his work. Cast a glance at the two methods of inflation, and say which is likely to prove the better. After pumping by hand for some time the barrel of the pump becomes hot and allows a great deal of air to pass the plunger instead of going in the tire, owing to the expansion of the metal from which the barrel is made and the wear on the leather plunger. While on the subject of heat it would be well to remember that through the heating action occasioned by friction the air in the tire is slightly heated by means of the hand pump, and consequently when it cools a contraction takes place, reducing the pressure; but the opposite is the case with carbonic acid gas, for with the heat generated by the tire while running the gas expands, giving more pressure under running conditions and in warm weather than when standing on the cold garage floor. Everything is against the unfortunate portrayed in Fig. 1, while the operator in Fig. 2 looks happy enough. The man who drives and looks after the car himself has only himself to please; so his troubles are on his own head, and there is no question of commissions to worry him. Being his own master, and having to pay his own bills, it only remains to point out that he will probably get better service from his tires if he resorts to mechanical pumping and save the cost of the instrument, whatever it is, several times over by reducing his repair bills.

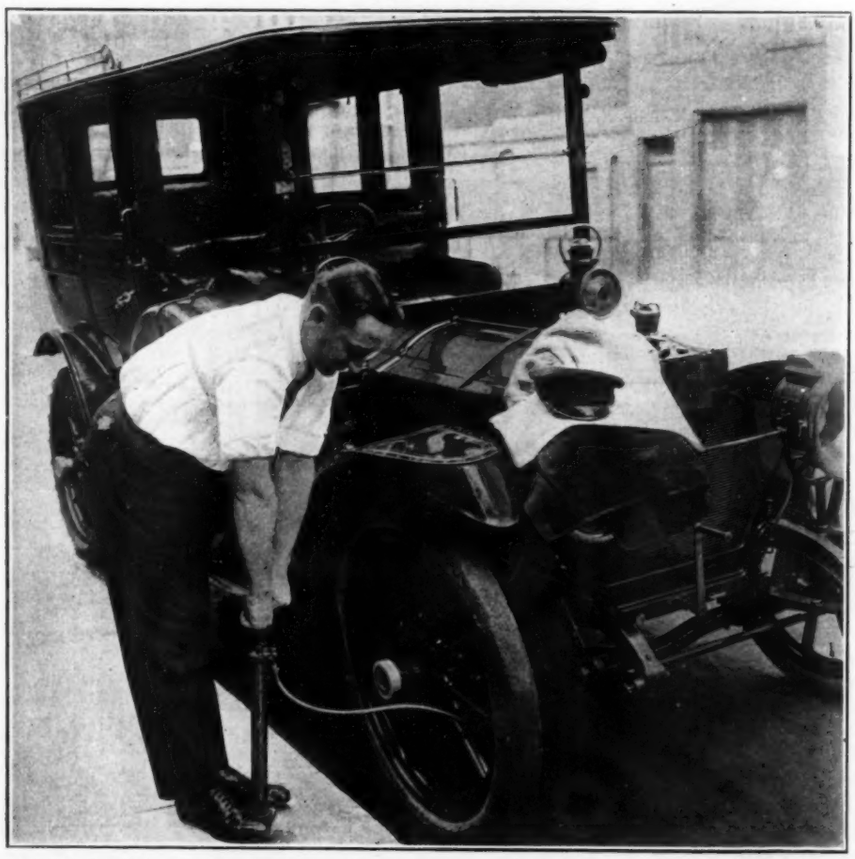


Fig. 1—Inflating big tires with a small hand pump—no chance of the pressure being enough to prevent flexure—the unfortunate pumper is really working hard to increase tire depreciation whether or not it is agreeable to him.

If a tire should happen to puncture or blow out on the road late at night,

or in a crowded street, don't say to yourself, "I have only a few miles to go," or "The garage is only a dozen blocks away." Procrastination in this case is directly putting his hand in the owner's pocket and taking out the equivalent of money. It is just in these few blocks that the damage is done that will cost the autoist money for repairs that would be otherwise unnecessary. One does not mind changing a tire in the presence of an interested audience, but when the cry is "All hands to the pumps!" and the small boys start snickering, "Aye, there's the rub!"

If a hand pump is used, a few drops of oil in the barrel occasionally will greatly help the leather to retain a good bearing on the barrel and will prevent it heating and drying up. Such small things as these appeal to everyone, and it is a matter that everyone knows; but how few do it? The methods employed by some drivers in pumping a tire make the work doubly hard, and the amount of air that finds its way into the tube is generally gaged by their physical endurance rather than by other factors, so that if the pumping is not carried out properly the tire suffers. The plunger must be pushed home to the bottom of the stroke, otherwise only a small quantity of the air will go into the tire, as the pump acts in the same manner as the engine on its compression stroke. The air becomes compressed in the bottom of the barrel and this compression must be higher than that in the tire to overcome the valve; otherwise it is useless to go on pumping to the distraction of nerves.

Fig. 2—A more prosperous condition—the chauffeur enjoys a happy situation—the tire is pumped up to the proper level, inducing long life, and cost is minimized

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Aviation Opens a Promising Field to Aluminum.—Aeronautical enterprises are becoming so numerous and the machines already promise so much that prognosticators seem free to predict that the aeroplane has a useful work, representing a new art, that it will outstrip the automobile in point of numbers and importance, taking less than ten years in the accomplishment of the task. Structural materials for aeroplanes are not on a well-defined basis, but it is believed that aluminum will claim its own in this field. In some of the earlier attempts to render aluminum strong, it was also increased in specific weight sufficiently to kill the advantage derived by adding strength, but the latest effort in this field goes to show that it is possible to make structural shapes that approximate the strength of steel, without increasing the weight of the aluminum alloy over that of aluminum itself.

Coming Events

CALENDAR OF FUTURE HAPPENINGS IN THE AUTOMOBILE WORLD THAT WILL HELP THE READER KEEP HIS DATES STRAIGHT—SHOWS, RACES, HILL-CLIMBS, ETC.

Dec. 1	Chicago, Ill., First Annual Aeronautical Exhibition in the Coliseum.
Dec. 31-Jan. 7, '11	New York City, Grand Central Palace, Eleventh Annual International Automobile Show.
Jan. 7-14	New York City, Madison Square Garden, Eleventh Annual Show, Pleasure Car Division, Association of Licensed Manufacturers.
Jan. 11-12	New York, Annual Meeting, Society of Automobile Engineers.
Jan. 14-28	Philadelphia, Annual Show, Philadelphia Licensed Automobile Dealers' Association, Third Regiment Armory.
Jan. 15-21	Detroit, Wayne Gardens, Detroit Automobile Dealers' Association.
Jan. 16-21	New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A.L.A.M.
Jan. 16-21	Detroit, Mich., Tenth Annual Show, Detroit Automobile Dealers' Association, Wayne Pavilion.
Jan. 28-Feb. 4	Chicago Coliseum, Tenth Annual National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Pleasure Cars and Accessories, Exclusively.
Feb. 6-Feb. 11	Chicago Coliseum, Tenth National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Commercial Vehicles, Pleasure Cars, Motorcycles and Accessories.
Feb. 18-25	Minneapolis, Minn., Annual Show, Minneapolis Automobile Show Association, National Guard Armory.
Feb. 18-25	Binghamton, N. Y., Second Annual Show, Binghamton Automobile Club and Chamber of Commerce, State Armory.
Feb. 18-25	Newark, N. J., Annual Show, New Jersey Automobile Exhibition Co.
Feb. 24-27	New Orleans, La., Annual Show, New Orleans Automobile Club.
Feb. 25-Mar. 4	Toronto, Ont., Automobile Show, Ontario Motor League.
Feb. 27-Mar. 4	Kansas City, Mo., Fifth Annual Show, Kansas City Automobile Dealers' Association, Convention Hall.
Mar. 4-11	Boston, Mechanics' Building, Ninth Annual Show, Licensed Automobile Dealers' Association.
Mar. 18-25	Pittsburg, Annual Show, Pittsburg Auto Show Association (Inc.), Exposition Hall.
Mar. 25-April 1	Buffalo, N. Y., Fourth Power Boat and Sportsmen's Show, Sixty-fifth Regiment Arsenal, Buffalo Launch Club.
Mar. 25-Apr. 8	Pittsburg, Annual Show, First week, pleasure cars; second week, commercial trucks. Automobile Dealers' Association of Pittsburg, Inc.
April 1-8	Montreal, Can., Automobile and Motor Boat Show, Automobile and Aero Club of Canada.

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COST, as it must be counted by the man who owns and operates an automobile, will be more or less depending upon (a) the quality of the car, and (b) the skill displayed in the operation thereof. The first consideration must be uppermost in the mind's eye of the automobilist when he goes into the salesroom and makes his selection. Having picked out the character of automobile that will do the kind of work of which the purchaser has a sufficient quantity, it remains to be intelligent and deliberate, if the cost of service is to be minimized. The best statistics that are available at the present time seem to indicate that tires are only serving to the extent of 37 per cent. of the reasonable expectation, which is another way for saying that the tire depreciation, due to carelessness and abuse, represents a cruel total of 63 per cent.

* * *

TIRE misuse, while it may be classified, is mostly due to lack of proper inflation, resulting in punctures, bruises, creeping trouble, blow-outs, rim cuts, overheating, disintegration, and last, but not least, the products of flexure. It is a great misfortune that owners of automobiles cannot be brought to a realization of the fact that they do not properly inflate the tires on their automobiles; they think they do. Indeed, they are in the same fix as a well-known automobilist to whom the Editor of THE AUTOMOBILE addressed the following letter: "In our campaign of education which has for its purpose the reduction of tire cost, we are taking pressures of tires as we find them on automobiles in the street, and you might be interested to know that the pressure in your own automobile tires was found to be as follows: Left rear tire 35 pounds per square inch; right front tire 42 pounds per square inch. These tires looked all right, but the pressure as found by the gauge goes to prove that they will wear out in a very short time."

* * *

CONSIDERING the fact that automobilists fail to look after the inflation of their tires, despite the many reasons given from time to time in the columns of THE AUTOMOBILE, it is feared that they are getting used to the cry of "wolf." It is too bad that it is necessary to examine all the automobiles that are in actual service only to find that the tires are not properly inflated, and to have to write a personal letter to each owner and warn him of the impending attack on his pocket-book. It will doubtless be an enormous undertaking to thus proceed, but unless each owner of an automobile who reads the stories that are being printed as the result of actual practical experience will have the goodness to appreciate that the tire inflation problem conceals a real wolf, some strenuous method will have to be contrived such as will bring him to a fuller realization of the fact that his tires will last at least three times as long as they do if he will pump them up.

* * *

RULE-OF-THUMB methods are at the bottom of a great many failures. It is this very way of doing things that results in the under-inflation of tires. In the average garage, an air-tank, under perhaps 90 pounds per square inch, is connected up with the tires to be inflated, and the artisans reach the vain conclusion that the pressure in the tires will also reach 90 pounds per square inch. Perhaps it will in not a few instances, but it has been found in actual practice that this pressure wiredraws down to as low as 60 pounds per square inch, thus showing that the tire valve is a most wasteful little beggar, and that while it serves extremely well in the process of keeping air in the tires, it is also a most unwilling servant when it comes to letting the air get in. Some valves are greater offenders than others; it therefore devolves upon each automobilist to apply a gauge to his tires after they are inflated and find out whether or not the air pressure in the inflated tank is free to transfer to the inflated tires. If, for any reason, there is a difference in pressure, it remains to supply the loss by increasing the tank-pressure, so that the tires will be inflated up to a safe point.

* * *

SPARK plug trouble seems to creep in when motors are run for a considerable period of time continuously, resulting in the melting out of the central electrode, and in order to avoid this trouble in some of the spark plugs tried out, the E. R. Thomas Motor Company, in its 500-hour run, as related in THE AUTOMOBILE, found it necessary to adjust the mixture for a somewhat lower power in order to obtain a cooler performance, until by a considerable amount of laboratory investigation the fault in the spark plug situation was remedied, after which it was found feasible to operate on a higher power level.

News Section

HAPPENINGS OF THE WEEK IN VARIOUS SECTIONS OF THE COUNTRY AS GATHERED BY THE 84 SPECIAL WRITERS AND CORRESPONDENTS OF "THE AUTOMOBILE"

A. A. A. in Annual Meeting—Selden Suit versus Ford and Others Closed—News of the Automobile Shows—Late Autumn Run of New York Automobile Trade Association—Lozier Wins Double Event at Los Angeles—Thanksgiving Day Race Meets—Briscoe Compares American and Foreign Cars—Peeps Through Auto Goggles at Distant Lands—Floods Threaten French Motor Manufacturing Plants; French Auto Club to Re-enter Racing in 1911—Other items of interest in a personal and business way to motordom gathered from all sides.

A. A. A. Decides to Enlarge Its Boards

REPRESENTING its membership in 39 States, the A. A. A. met in ninth annual session at the Belmont yesterday morning. The day was spent in listening to reports of officers and committees and in discussing the various matters brought out in them. L. R. Speare, president, announced that he was not a candidate for re-election. In delivering his valedictory Mr. Speare submitted a number of suggestions aimed to increase the representative character of the organization. These, in a general way, provided for an enlargement of the four chief boards of the association, namely, touring, good roads, legislative and contest, by automatically providing for membership in them of the chairmen of corresponding committees in all A. A. A. clubs. This was enacted with the proviso that an executive committee should be selected to carry on the work of the boards in the discretion of the chairmen.

The other reports showed that the association now has 34,946 members, more than doubling in the past two years. There was $9,423 in the treasury when H. A. Bonnell formulated his report.

The most important work of the session was the selection of a nominating committee, as follows, which will report at 10 o'clock this morning: C. H. Gillette, chairman; F. E. Edwards, George C. Diehl, H. L. Vail, J. N. Edwards, Paul C. Wolff and L. R. Speare.

Selden Suit versus Ford Is Closed

When attorneys for both sides of the Selden litigation concluded their presentation of the facts and law involved in the suit on Friday last and bowed to the bench, upon which were seated Judges Lacomb, Ward and Noyes, the most momentous legal incident in the history of motordom was finished as far as the litigants were concerned.

Both sides had been given the utmost latitude in construing the case, and when the court took it the judges had been informed most thoroughly as to the divergent merits. The facts as they were presented were the same as in foregoing steps in this litigation, but the attorneys took some unusual tacks in arguing from them. The contention of the A. L. A. M. was narrowed to a specific base of priority of patent, and the heaviest guns of the appellants were directed toward this same point.

The merits of the patent were carefully discussed, but the case as presented will probably turn upon the question of priority.

Among other interesting happenings in the legal sphere was the filing of the answer of the Delahaye Import Company to the action of the A. L. A. M., which had alleged infringement of the Selden patents and had applied for an injunction. The answer formally denies the material charges of the complainant, and in reply states that Selden committed laches in delaying to perfect and enforce his patent and that such delay constituted abandonment within the purview of the law.

Concerning the date when the decision will be handed down, the most authentic advices are that nothing will transpire within two weeks, and it would be within the range of possibility were the decision withheld for upwards of two months in accordance with customary practice in Courts of Appeal.

Annual Meeting of the S. A. E. Fixed

According to the usual custom the Society of Automobile Engineers will hold the annual meeting in New York City this Winter. The committee on meetings and entertainment has fixed the date of this meeting for January 11 and 12, 1911, at the Automobile Club of America. There will also be a banquet, which will be held on Thursday evening at the Automobile Club of America. It is promised for this banquet that it will hold much of interest, divided up between viands that will whet the appetite and entertainment which will tickle the intellect. Further details will be announced as plans are perfected.

Licensed Dealers Elect Stewart

At the recent meeting of the Licensed Automobile Dealers of New York City Charles A. Stewart was elected general manager, to succeed James M. Carples, who resigned to go with the Daimler Import Company.

Mr. Stewart was formerly assistant educational director of the West Side Young Men's Christian Association, 318 West 57th Street.

M. A. M. Will Banquet January 13

Plans for the annual banquet of the Motor and Accessory Manufacturers have been announced. The banquet will be held January 13 at the Waldorf-Astoria. It is expected that the function will be the largest and most important of the annual banquets of this organization.

Gasoline Engine Men to Meet

RACINE, WIS., Nov. 28—The annual meeting of the National Gas and Gasoline Engine Trades Association will be held in this city from December 12 to 15. An elaborate program for the sessions and an interesting exhibition has been arranged.

Trade Credit Association to Dine

Arrangements have been made for the annual dinner of the Automobile Trade Credit Association of New York, which will be held January 18 on a scale heretofore unsurpassed by that organization. Members will be allowed to invite friends.

News Notes of the Coming Automobile Shows

WHEN the A. L. A. M. show opens in Madison Square Garden next month there will be 68 different makes of gasoline pleasure cars on display, and many of them will show considerable improvements in body design. The sloping front, which lends itself to smaller wind resistance, and therefore augments speed, is being revived. This type was given some vogue about ten years ago, but foreign patents subsequently prevented its general use. These patents have expired in some instances, and the pointed hood will be seen much more frequently than in the past. The general adoption of fore-doors will also strike the visitor, as the trade has accepted this improvement in body construction with much unanimity.

As has been outlined in the past, automobile manufacture, exemplified in the exhibits to be shown at the Garden, has been slowly dividing into two semi-distinct channels. On the one hand is the luxurious touring car and on the other the light surrey or runabout for city use or for short trips out of town. It has been demonstrated that one type of automobile is not sufficient to fill all the uses to which the motor car can be put, and many owners of touring cars have provided themselves with light cars for city work, and vice versa. Both types will be shown in much variety.

Importers' Salon Making Ready

IT is announced that the Importers' Automobile Salon will be held this year at the Hotel Astor during the week beginning Monday, January 2. Three of the Astor's largest and most palatial rooms, including the celebrated ball room and the "Rose Room," aggregating a total of 16,000 square feet of floor space, are to be thrown together for this occasion, and it is the intention of the committee to make of this show a distinctly drawing-room affair. Music will be provided by a large orchestra, and private boxes for the accommodation of spectators will be one of the innovations. The Importers' Salon has heretofore always been included as a star feature of the Unlicensed Manufacturers' Show at Grand Central Palace. The cars will be shown to advantage, and, at the same time, crowding and discomfort on the part of the spectators will be avoided.

The new models of practically every well-known foreign car on the market in this country will be exhibited as follows: Panhard & Levassor, A. Massenat, Gen. Mgr., will exhibit the Panhard car; the Darracq car will be shown by Henry Ducasse & Co.; Mr. Paul Lacroix, Gen. Mgr. of Renault Frères Selling Branch, has arranged for a full exhibit of Renault cars; while six new models of the De Dion Bouton car, three of which have been especially designed for the American market, will be shown by Mr. E. Lascaris, Gen. Mgr. of the American selling branch. The Benz Import Co. has made a space reservation for Benz cars; the Itala and the Daimler cars will share the space reserved by A. T. Demarest & Co., and another reservation has been made for the S.P.O. car. Cæsar Conti, for the S.P.A., has arranged to exhibit; Emile Voigt, of the C. G. V. Import Company, will be in charge of the exhibit of these cars; while Burr & Co., the well-known body builders, will show the latest products of their factory. Another exhibit will be that of the Gnome and of the Anzani motor.

Paul Lacroix is chairman of the committee in charge of the Salon, the other members being E. Lascaris, Secy. and Treas., and Warren Demarest.

Aeroplanes at the Palace Show

Associated with the Palace show of automobiles and accessories will be a section devoted to aeroplanes. One whole floor of the building has been set aside for this feature of the show and the plans announced so far contemplate a large exhibition. Several of the aeroplanes that were imported under bond to take part in the recent aviation meet at Belmont Park will be shown. Particular emphasis will be laid upon commercial aeroplanes so far as they have been developed.

The list of motor car manufacturers signed up so far includes 66 names. The additional list since last week is as follows: Maytag-Mason Motor Co., Waterloo, Ia.; Ideal Motor Car Co. (Sage & Creighton truck), Detroit; Velie Motor Vehicle Co., Moline, Ill.; Colt-Stratton Co. (Cole "30"), New York; Flanagan Motor Car Co. (Monitor truck), Brooklyn; Otto Motor Car Co., of New York (Crown truck), and the Carter Motor Car Corporation, of Washington, D. C.

The color scheme in which the Palace will be decorated will be a groundwork of cream with crimson trimmings.

Omaha Show Plans Far Advanced

OMAHA, NEB., Nov. 28—The officers of the Omaha Automobile Dealers' Show Association are already making elaborate preparations for the automobile show which will be held February 20-25. The list of exhibitors has been prepared and the decorative scheme for the auditorium has already been worked out, containing many new features, but this is being kept quiet at present.

Two new companies have recently been organized in Omaha, and they will probably be added to the list of exhibitors, which is as follows: Capron & Wright, Speedwell automobile; Coit Auto Co., Mitchell; Cadillac Auto Co., Cadillac, Woods Electric; John Deere Plow Co., Velie; Deright Auto Co., Stoddard-Dayton, Locomobile, Waverley; Electric Garage Company, Packard, Rauch-Lang, Baker; E. M. F. Co., E. M. F., Flanders; H. E. Frederickson Co., Pierce-Arrow, Thomas, Chalmers, Hudson; Freeland-Brothers-Ashley, Midland, Maytag-Mason; Ford Motor Car Co., Ford; Huffman Auto Co., Hupmobile; Kissel Auto Co., Kisselkar; Lininger Implement Co., Oakland; Mid-West Auto Co., Cole, Westcott; Andrew Murphy & Sons, Frayer-Miller. Randolph trucks, and International; T. G. Northwall Co., Brush; Nebraska Buick Auto Co., Buick, Olds; Omaha Auto Co., Auburn; Rambler Motor Co., Rambler; Guy L. Smith, Franklin, Peerless; Standard Auto Co., National; United Motor Omaha Company: Van

Striking poster designed to advertise the coming A. L. A. M. show

Brunt Auto Co., Oakland, Marion, Pope-Hartford; Wallace Auto Co., Stearns; Apperson Sales Agency, Apperson; E. R. Wilson Auto Co., Lexington; Baum Iron Co., supplies; Central Tire & Rubber Co.; Omaha Rubber Co., Powell Supply Co., Western Automobile Supply Co.

The two recently organized companies are the Inter-State branch and S. A. Houser, agent for Croxton-Keeton cars.

Factories whose cars are not sold in Omaha have applied for space so that every available inch of room in the auditorium will be occupied.

Only One Show at Milwaukee

MILWAUKEE, WIS., Nov. 28—Milwaukee will have only one motor show in 1911. Up to a few days ago the prospects were for two shows, the first under the auspices of the newly organized Milwaukee Automobile Dealers' Association, and the second under auspices of the Milwaukee Automobile Club, which has conducted two successful shows. The dealers' association is the outgrowth of the opposition offered to the club show in February, 1910, when fourteen representative agents held private exhibitions and refused to join the club's exhibitors. The association stole a march on the club by leasing the Auditorium for the week of January 15. The club held an option for the use of the big exhibition hall during the week of February 13, this date being selected because it is the week following the Chicago passenger vehicle show, from which it draws considerable business. It was well known that Milwaukee could hardly support two shows and that the dealers were powerful enough to make the club's show the lesser of the two. After some negotiation a committee of the club and another of the dealers agreed upon one show, to be held during the week of January 15, or at the same time as the Detroit show. The show will be officially under the auspices of the dealers' association, but with the official co-operation of the club, which will participate in the earnings. Under this arrangement the 1911 Milwaukee show will be one of the biggest expositions of its kind in the United States, with the exception of the New York and Chicago shows. Frank J. Edwards, the Milwaukee Kisselkar representative, is chairman of the show committee. Bart J. Ruddle will manage the show.

Oakland Show Breaks Record

OAKLAND, CAL., Nov. 28—With eighty-one different makes of automobiles on exhibition the Oakland Automobile Show proved to be the largest ever held on the Pacific Coast. The affair was the first at which any considerable number of 1911 models were shown and was a complete success in every way.

The show opened November 19 with over $1,000,000 worth of cars on display in the show pavilion. These included eight makes of electrics, eight freight vehicles and sixty-five kinds of gasoline pleasure cars. In both the electric and commercial lines the displays were the most complete ever shown in the Far West. Among the newcomers exhibited were: Imperial, Amplex, Babb-Carter truck, six-cylinder Locomobile, Moon, Michigan and others.

The Vanderbilt Cup was a feature of the display. Idora Park, where the show was held, was arranged as a redwood forest. Carter truck, six-cylinder Locomobile, Moon, and Michigan.

Cleveland to Have Two Exhibitions

CLEVELAND, O., Nov. 28—As a result of the incorporation during the past week of the Cleveland Automobile Dealers' and Manufacturers' Association, Cleveland will have two automobile shows in 1911, the same as in 1910. The association will hold its show at Central Armory during the week of March 13. This will allow at least one week intermission between the two shows, the other being, as announced last week, that of the Cleveland Automobile Show Co.

The new incorporation includes mostly those dealers and manufacturers who participated in the second show of 1910. The committee as announced comprises Ray M. Colwell, chairman; W. H. Barger, treasurer; Harry Smith, M. B. McLauchlin and A. R. Twelvetree. Before the meeting adjourned applications had been made for space by twenty-six exhibitors. Spaces will be awarded by drawing, the same as last year.

Pittsburgh Dealers Will Hold Show

PITTSBURGH, PA., Nov. 28—Thirty automobile dealers of Pittsburgh have formed an incorporated association to hold annual automobile shows, and have selected the Exposition building on account of its central location and adaptability for show purposes, having more floor space than Madison Square Garden, New York, where the National Auto Manufacturers' shows are held annually. The show will be held during the week of March 18-25.

Thomas I. Cochran, who was on the show committee and managed the first two automobile shows held in Pittsburgh, has been appointed manager.

A downtown office has been established on the tenth floor of the Union Bank Building. Floor plans of Exposition Hall are being prepared and a drawing of space will take place in another week, and all automobile and accessory dealers will be invited to take space and co-operate to make the show a success.

St. Louis Dealers Want Show

ST. LOUIS, MO., Nov. 28—An independent show seems to be more than a possibility in St. Louis, following the decision of the St. Louis Dealers' and Manufacturers' Association not to hold the regular exhibit. At a meeting of the association held last week there was a vote of 18 to 14 against the 1911 show. There were 33 members present, or about half the membership list.

Many of the dealers are not contented, and persons who have made a thorough canvass report that about 20 are anxious for an independent show.

Other Shows Making Progress

WASHINGTON, D. C., Nov. 28—The annual show will take place the week of February 13. It will be devoted exclusively to automobiles and accessories. The committee in charge consists of the following: W. C. Long, J. R. Thomas, J. M. Stoddard, T. B. Spence, A. G. Carter, William Jose, Claude Miller, T. C. Johnston and S. A. Luttrell. It will be held in Convention Hall.

SYRACUSE, N. Y., Nov. 28—C. Arthur Benjamin, head of the Automobile Dealers' Association, expects to announce dates for the annual show in Syracuse within a short time. The show will probably be held in March at the Armory.

HARTFORD, CONN., Nov. 28—The Hartford Automobile Dealers' Association will conduct a show as usual at the Foot Guard Armory, probably during the first week in February. Applications so far break all local records.

Boom Chicago Show with Stickers

CHICAGO, Nov. 28—The Tenth Annual Automobile Show at Chicago will be advertised by those who have taken space in it, and a peculiarly effective sticker for use in the mails has been devised by Manager S. A. Miles. This sticker is in the form of a seal in black, gold and white. It may be applied to the back of the envelope or upon the face of the correspondence letterhead of the concern interested. The little sticker is well contrived, and it is likely that a large number will go into circulation.

Sticker used to advertise the Chicago Show

As they lined up for the start, showing the White Steamer, National, Stearns, Stoddard-Dayton, Maxwell, Columbia, two of the Pullman starters, Matheson and others

Group of official cars and two of the contestants at the start. The contesting cars are a National in the foreground, and a Reo.

Sturdy Cars Make Trying Two-Day Run in Snow

PLOWING through snow and slush over roads that ordinarily would afford a pleasant ride, but which under the weather conditions of Tuesday were frightful, a column, consisting of 21 automobiles of 1911 models, started from New York on the first leg of the two-day endurance run promoted by the New York Automobile Trade Association.

The route was to Danbury, Conn., and return, 137.6 miles, and the first few stretches of the run were accomplished under favorable conditions. After that the column ran into a snow storm which covered the hills and made the going perilous. Despite the slippery and slushy roads the contesting cars made an excellent showing. No mechanical trouble was reported unofficially at the end of the day's run, and but little tire trouble was experienced. The drivers, observers and officials were so thoroughly exhausted at the end of the day that no formal report was published.

Unofficially it was learned that several of the cars had difficulty in keeping the course. Confetti in a snow-storm is impossible, and the route had to be indicated with a series of red arrows. Some of the cars missed these, with the result that the bulk of the penalties imposed for road work on the first day were for lateness at controls.

In order to show just how excusable it was to miss the road, the fact may be cited that the checkers' car, which was a contestant in the Vanderbilt Cup race this year, missed the route and had to make a detour of over ten miles, going over part of the extra loop at better than 60 miles an hour. The pacemaker, a Zust, was also well back in the procession during the return trip.

On the first day checking stations had been established at Brair Cliff and Greenwich in addition to the noon and night controls.

The route followed on the second day was to Newburgh, N. Y., and return, 139.2 miles. The roads were muddy in the morning through Hudson County, but the day was much pleasanter than Tuesday. The route lay through Ramapo and Tuxedo, over splendid highways. After leaving Newburgh a snowstorm dampened the ardor of everybody, and when the cars straggled into Weehawken the tourists were pretty well exhausted. Some little mechanical trouble developed during the run and many cars experienced tire trouble. A large number of the contestants will be penalized for lateness at control, and the technical examination is expected to develop some weaknesses. The officials have taken the scores and announce that the results will be given out next Saturday.

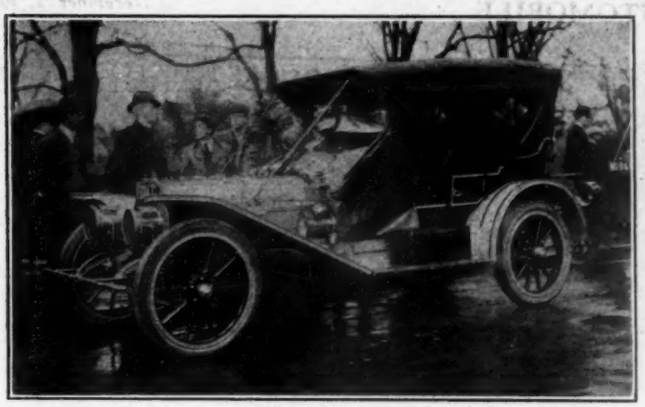
The prizes offered for the winners in each class were more than usually numerous. An even dozen valuable trophies were hung up by various individuals and accessory companies. A. R. Pardington acted as referee. C. H. Larson was starter.

The entry list included the following:

Car	Entrant	Driver.
Class A, Division 1-A—		
Ford	Ford Motor Co	D. B. Young
Division 2-A—		
Mitchell	Mitchell Motor Co	O. R. Delamater
Hudson	A. Elliott Ranney Co	A. M. Day
Division 3-A—		
Pullman	Cimiotti Bros	Roy Stains
Reo	R. M. Owen & Co	P. Haycock
Marion	Chas. E. Reiss	P. G. Thebaud, Jr.
Maxwell	W. B. Byrnes	J. Ross
Division 4-A—		
Pullman	Cimiotti Bros	Norman Gallatin
Haynes	Haynes Auto Co	R. Schmidt

The White Steamer (press) with perfect, unofficial score

Reo, No. 8, a contender in Division 3-A



Powerful Matheson 6, which did well on the slushy hills

Hudson runabout, which performed in its usual good form

Division 5-A— Car	Entrant	Driver
National	Union Auto Co.	F. Hermance
National	Poertner Motor Car Co.	W. C. Poertner
Stoddard-Dayton	Stoddard Motor Co.	H. Harding
Pullman	Cimiotti Bros.	Herbert Welker
Babcock	Short & Wright	C. White
Corbin	Warner Instrument Co.	H. H. Knepper
Speedwell	Garland Auto Co.	A. Holtzmueller
Division 6-A—		
Columbia	United Motor Co.	Gordon M. Wagner
Oldsmobile	Oldsmobile Co.	T. Spear
Matheson	J. C. Blanch	D. A. Hall
Pope-Hartford	Pope-Hartford Co.	A. Warren
Stearns	Mrs. G. H. Wallace	G. H. Wallace

Lozier First in Star Santa Monica Events

Los Angeles, Nov. 24—Making motor history, a Lozier driven by a Los Angeles pilot, Tetzlaff, proved the winner of the Santa Monica road race of 202.006 miles, run on Thanksgiving day, broke the American road racing record with an average of 71.4 miles an hour and also won the heavy stock car race at 151.5 miles, averaging 73.29 miles an hour.

A Pope-Hartford was a fair second in the stock car race and a rather distant runner-up in the free-for-all.

Two light car events were staged prior to the big races, and a Maxwell annexed the honors in the 161-230 class; while a Duro, a Los Angeles product, was first at the tape in the 231-300 cubic inches class.

It was a perfect day on a perfect course. Not an accident marred the enjoyment of the 75,000 spectators, and the mechanical troubles of the cars contesting were not many.

The heavy stock car event was started at 9:15, and the Lozier took command at the outset and held it throughout, winning by nearly six minutes.

The car was not removed from the course before taking part in the Santa Monica free-for-all. Changed spark-plugs and a hasty manicuring constituted its preparation for the big trial. In the running of the race, the Fiat racer led for one lap, when the Lozier came along and took the pace. From there to the finish the white car stayed in front, but at one time the Fiat nearly caught it. At the end the Lozier was jogging along, taking things rather easily, to win by some 15 minutes.

The Pope-Hartford was second, having suffered trouble with a valvespring in the middle distance. While these two were the only cars to complete the course officially, the Knox was running along in its twenty-second round and the Ohio in its sixteenth when the checkered flag announced the end of the race. The Fiat, after performing creditably for sixteen laps, broke its crankcase. The Isotta entry broke a connecting rod in the sixth and The Only Car froze its piston before the end of the first lap. The Apperson did a dozen rounds before engine troubles put it out of the contest.

Dick Ferris managed the races and presented the trophy that went to the winner of the heavy stock car race. The summary:

Car	Driver	Time
161-230 Cubic Inch Class—12 laps		
Maxwell	Farcher	1:02:31
Oakland	Okerman	Out, 3d lap
Staver	Fouch	Out, 1st lap
231-300 Cubic Inch Class—12 laps		
Duro	McKeague	1:01:04 3-5
Maxwell	Smith	1.04:15
Petrel	Arthur	1:58:48
Mitchell	Greer	Out, 11th lap
Mercer	Bigelow	Out, 10th lap
Buick	Mikrent	Out, 5th lap
Cutting	Clark	Out, 1st lap
301-600 Cubic Inch Class—18 laps		
Lozier	Tetzlaff	2:04:10 4-5
Pope-Hartford	Dingley	2:10:00 3-5
Franklin	Selbel	Running, 17th lap
Knox	Brown	Out, 6th lap
Apperson	Ryall	Out, 4th lap
Free-for-all—Prize, $2,000—24 laps		
Lozier	Tetzlaff	2:49:59
Pope-Hartford	Dingley	3:04:47 1-5
Knox	Brown	Running, 22d lap
Ohio	Henwood	Running, 16th lap
Fiat	Dearborn	Out, 17th lap
Apperson	Ryall	Out, 13th lap
Isotta	Soules	Out, 6th lap
Only	Van Valin	Out, 1st lap

One of the three Pullmans on the road

New type Columbia checking in at Danbury

Thanksgiving Day Races at Guttenberg Track

FAVORED with glorious weather and a large attendance, the automobile races held at the old Guttenberg race track on Thanksgiving Day for cars nominated by Hudson County auto dealers should prove the commencement of a series of good meets easily accessible to Jerseyites and New Yorkers alike.

Two of the three star performers—"Cyclone" Fiat and Grand Prize Buick—gave good account of themselves, while troubles prevented the other, a Pope-Hartford, from showing its speed. Previous to the racing proper, during a trial spin of the Fiat at a fast clip, one of the rear tires blew off and hit the driver in the face, swelling his lip badly. Later, in the 20-mile free-for-all, while leading the field by nearly a mile in the eighth lap, the Fiat was seen to turn round on the lower bend and slide through the small fence; this was caused by the snapping of a steering arm short off at the axle, rendering the steering gear useless and putting the car out of the race.

In the 15-mile race, when over a lap in the lead, the Pullman broke a wheel, but this was replaced later and the car came in second in event No. 5. The National, entered by the Union Auto Company, proved the best prize winner, finishing first in the 20-mile free-for-all and 5-mile stock class for cars with engines of from 30 to 60 cubic inches piston displacement and second to the big Fiat in the 10-mile free-for-all.

Burman's exhibition on the Grand Prize Buick proved that the track has possibilities for fast driving, although the dust was apparent when a bunch of cars came together.

In the 20-mile free-for-all one of the entrants, a Matheson, fired its right rear brake, but no damage was done.

It was interesting to note what pressures some of the tires on the racing cars were inflated to, and when tested with a gauge three showed under 45 pounds per square inch.

The method of timing employed was for the four timers to start their watches at the gun and clock off as they thought the cars finished, and discrepancies were only matters of fifths of a second.

The management of the meet was in the hands of O. D. Corbett and its success is greatly due to his hard work. The following gentlemen comprised the officials: Referee, P. T. Powers; representative of the contest board of the A. A. A., A. F. Camacho; judges, F. W. Dunham, J. F. Bernstein, E. J. Schroeder; starter, G. A. Blakeslee; assistant starter, C. W. Grant; chief timer, L. L. Niedrach; deputy timers, H. E. Adams, J. F. Johnson, Hugh Falvey and Bert Ackland. The announcing was in the hands of J. F. Drumm, and the legal adviser was W. J. MacFadden.

The paddock at the Guttenberg races on Thanksgiving Day

The summary:

Class E—Five miles for stock cars under 231 cubic inches—

No.	Car	Driver	Time
8	Maxwell	T. Costello	6.07
9	Abbott-Detroit	M. Bassie	6.09
7	Maxwell	T. C. Wolverton	6.20

Class D—Ten-mile free-for-all—

10	F. I. A. T	R. De Palma	10.16
18	National	D. C. Teetor	11.35
17	Buick	C. Beach	11.45
14	Pullman	W. Burke	12.11

Class C—Fifteen-mile stock chassis, 231 to 300 cubic inches—

19	Mitchell	V. Wilhelms	20.21 1-2
	Pullman	Broke wheel when leading by two laps; did not finish	

Exhibition—Ten miles—

Marquette Buick, B. Burman. Time, 9.57½.
Time by laps—1st, 1.07; 2d, 2.07; 3d, 3.07; 4th, 4.05; 5th, 5.04; 6th, 6.03; 7th, 7.01; 8th, 8.00; 9th, 8.58; 10th, 9.57½.

Class D—Twenty-mile free-for-all—

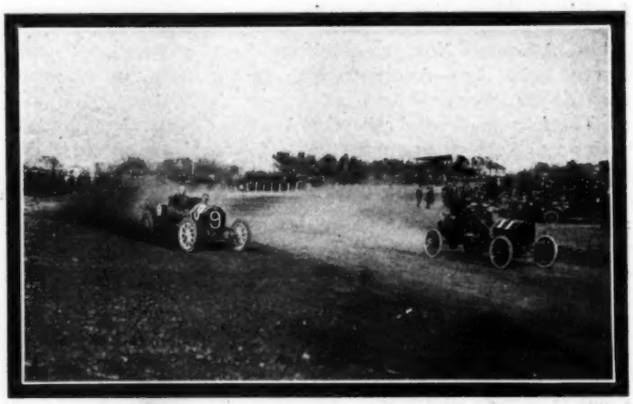
18	National	D. C. Teetor	23:00
23	Matheson	Neil Whalan	23:12
8	Maxwell	T. Costello	23:19 1-2
15	Pullman	W. Burke	23:20

Class E—Five miles, stock chassis, 300 to 600 cubic inches—

18	National	D. C. Teetor	5:32
14	Pullman	E. T. Gilliard	5:34 1-2
15	Pullman	W. Burke	5:54

First Race Meet at Bridgeton

BRIDGETON, N. J., Nov. 28—Thanksgiving Day saw the first race meeting for automobiles ever given by the newly formed South Jersey Motor Club. The races were held on the track of the Bridgeton Driving Association, a half-mile oval, and were well contested. Seven events were carded and the fields were small.



Hudson and Abbott-Detroit in the 20-mile free-for-all

The program opened with a match between a Pullman (Harvey Ringler) and a Parkin (Parkin). The latter won, the five miles being made in 7 minutes. The same car also scored in the next event against a Jackson (Blockson). In the next a Mercedes (Kelley) defeated a Kline. The Jackson won the following number from a Pullman and the tri-country race went to a Buick (Harry Hunt). The special handicap was won by a Mercedes, and in the last race of the day a Buick finished ahead of a Pullman. A big crowd was present.

Pullman Wins Big Class and Sweepstakes

HARRISBURG, PA., Nov. 28—Winning its class, 6A, as well as the sweepstakes offered in the Autumn run of two days given by the Motor Club of Harrisburg, Pullman No. 3, driven by Herbert Walker, finished with clean road and technical scores.

The other class winners were as follows: Division 3A, touring car section, Reo; runabout section, Kline. Division 4A, touring car section, no contestants; runabouts, Velie. Division 5A, touring car section, Pullman; runabouts, Pullman. Division 6A, touring cars, Columbia; runabouts, Pullman.

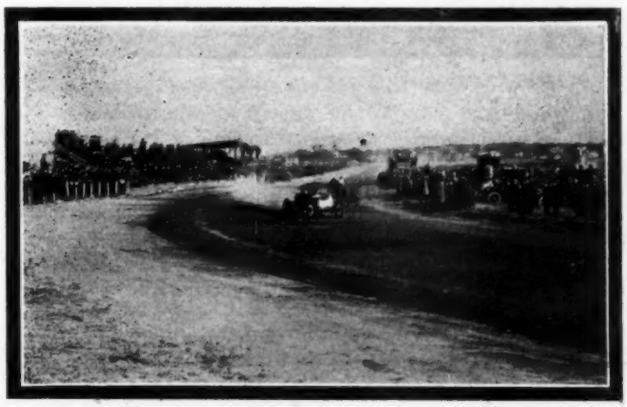
Fakers' Friend Breaks Out Again

Sane regulation of automobile racing and the protection of drivers and spectators are things so entirely to be desired that they are not debatable. Far be it from the intention of THE AUTOMOBILE to defend such things. But the prospects for improvement in conditions are always injured by misrepresentations, and THE AUTOMOBILE takes occasion to correct some statements that appeared in a New York evening paper of wide circulation, signed by the sporting editor of the publication.

In a recent article this writer says: "Two drivers and a mechanic were killed at the Savannah Grand Prize race, and it won't be long at this rate before all of the men we saw out on Long Island that fatal day are numbered among those who gave up their lives and are forgotten. Ten per cent. of the men who started in the Vanderbilt Cup race have been killed outright or died from injurious [*sic*] received in auto racing!"

It is easy enough to make wild statements that appear ridiculous after they get cold, and the above is one of these. Without considering the opening inaccuracy about the Savannah race, in which nobody was killed at all, the rest of the conclusions are based as follows: There were 43 actual starters in the Vanderbilt Cup race and light car contests. Consequently there were 86 men engaged in driving the contesting machines. Of these, two mechanicians were killed. Since that time Al Livingston met with a fatal mishap while practicing at Atlanta and Tobin De Hymel was killed in a race upon a Texas dirt track.

All of which is lamentable, deplorable and worthy of sober thought. But in the name of common sense, what is the use



Pullman leading Mitchell in the 15-mile stock chassis race

of slobbering over cold facts? Four men were killed who took part in the running of the Vanderbilt Cup. That is bad enough. Thus less than 50 per cent. of what the sporting editor wrote and signed was true.

Naturally enough, that might be considered a flattering percentage of truth coming from the only sporting writer in New York who did not know that the recent Sheepshead Bay fiasco and moving-picture fake between an outlaw driver and a negro pugilist was such long before it was perpetrated upon the public. Right up to the last gasp this writer handled the nauseating publicity dope sent out by the fakers, and undoubtedly a considerable portion of the crowd of dupes that paid real money to see the "race" were attracted by his articles.

Atlanta Speedway Free to Flyers

ATLANTA, GA., Nov. 28—When the coming aviation meet is staged in Atlanta the airmen will fly at the grounds of the Atlanta Speedway. The big plant has been donated to the use of the flyers by the Atlanta Automobile Association with its immense stands, inclosure and complete equipment. Official notification of the action of the association has been conveyed to the Atlanta *Journal*, which is promoting the meet.

Hunt Jackrabbits in Automobiles

HIAWATHA, KAN., Nov. 28—Over 300 automobiles were used Thanksgiving Day in the most throughly unique jackrabbit hunt ever attempted on earth. The game was started from its hiding places in the bunch grass by a wire, half a mile long, to each end of which was attached a big automobile. The cars were run across country and the wire scraped along the flat surface of the fields. Dogs did the actual hunting, a matched pair riding in the tonneau of each car until the game was flushed. They were then unleashed and "worked" the rabbit until he was captured.

Farmers from all over this country "followed the hounds" in their motor cars.

Maryland Club Maps Campaign

BALTIMORE, MD., Nov. 28—The Automobile Club of Maryland has mapped out a progressive program for the winter and appointed the following committees for the ensuing year: Runs and tours—Joseph M. Zamoiski, chairman; Isaac Field and H. C. Weiller. Laws and Ordinances—O. I. Yellott, chairman; C. H. Millikin and James W. Bowers, Jr. Auditing Committee—W. A. Dickey, chairman; R. M. Rother and Dr. S. C. Pennington. House Committee—James S. Reese, chairman; C. W. Strok and L. F. Lambert.

The club sent a delegation to the Police Board of Baltimore to talk over the traffic laws of the State, and an agreement was reached whereby the board and club members will co-operate.

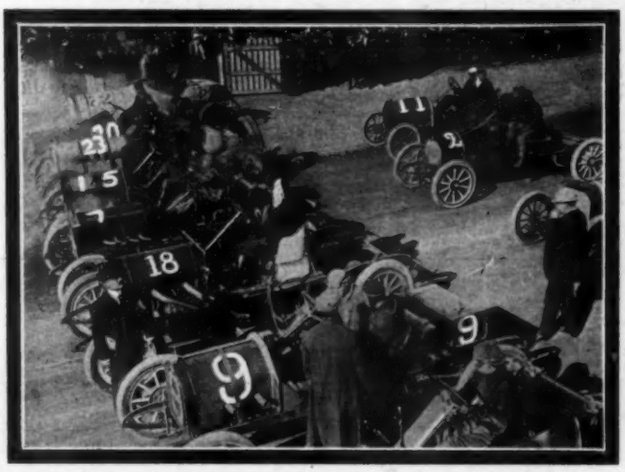
Newark Club to Give Annual Banquet

NEWARK, N. J., Nov. 28—The New Jersey Automobile and Motor Club will hold its eighth annual banquet in Newark in the early part of January next and Vice-President Harry D. Bowman, who has this event in his charge, expects to make this year's event bigger and better than ever.

Legislative matters will be discussed and speakers of national repute will address the assemblage, which will prove the banner social event of North Jersey.

Camden Motorists Form Club

CAMDEN, S. C., Nov. 28—The Camden Automobile Club was recently organized with Jno. W. Corbett, M. D., president; F. M. Wooten, vice-president; H. L. Watkins, treasurer; and M. H. Heyman, secretary. The club has already gone to work to post the through roads of Kershaw County, with particular reference to the connecting link between the National and Capital highways, from Charlotte, N. C., on the National highway, to Camden, on the Capital route.



Start of 20-mile free-for-all at Guttenberg, won by National No. 18

Briscoe Compares Foreign with American Cars

LOOKING actually rested from his six weeks' trip abroad, during which he accomplished an immense amount of work, Benjamin Briscoe, president of the United States Motor Company, with Mrs. Briscoe, reached home last week on the Mauretania. He visited England twice and toured in France and Germany, established the foundation of a great factory and distributing plant—perhaps two—visited leaders in the trade and attended the Olympia show in London. Despite all of that activity, he had time to discuss the fundamentals of trade on numerous occasions for technical press and newspapers and created a favorable impression upon the British public.

The concrete result of Mr. Briscoe's trip was the formation of the United International Motors, Limited, which, as has been outlined in THE AUTOMOBILE, will be affiliated with the United States Motor Company and will build and sell several models of the American cars in foreign fields.

Mr. Briscoe's examination of the European situation developed the fact that there is a considerable potential demand for cars of moderate and low price, that may be used for business purposes by professional men, contractors, etc., and which also possess the features and advantages of purely pleasure cars.

In discussing this matter, Mr. Briscoe said:

"The average price of English-made automobiles is about $1,900, which indicates quite strongly that the English manufacturer has not grasped to the full the ultimate universal mission of the automobile. But the English public is fast becoming aware of the fact that the automobile spells economy, for the demand for moderate priced cars seems to be growing much faster than the production, although several of the British makers are turning out cars selling around $1,000. Last year 14,239 cars were made and sold in England, while in Germany and France the number was about 8,000 each. The total sales in those three countries amount to about one-sixth of the American sales, while the value is about one-half of the total amount realized from motor car sales in the United States.

"The amount represented by cars imported from the United States is very small compared with the figures from other countries. Out of a business of nearly $20,000,000 in 1909 the portion of the United States was only a trifle over $600,000. These figures might seem to indicate some prejudice in England against American-made cars and undoubtedly that does constitute an element in the totals, but the main fact that militates against the American cars is that they are made to travel American roads, which are far different from those of England. In my opinion it is impracticable for American manufacturers to place lines of cars in England (cars that are made to meet American road conditions) with the hope of doing a very large business.

"I found that there are over 240 models of cars made in Great Britain, and an average of 60 cars to the model is a fair estimate. Thus it seems as if the British manufacturers actually wished to multiply the number of models, with all the confusion to the trade that such a condition might presuppose. But I would not wish to give the impression that the trade is anything but prosperous over there, for it is extremely so.

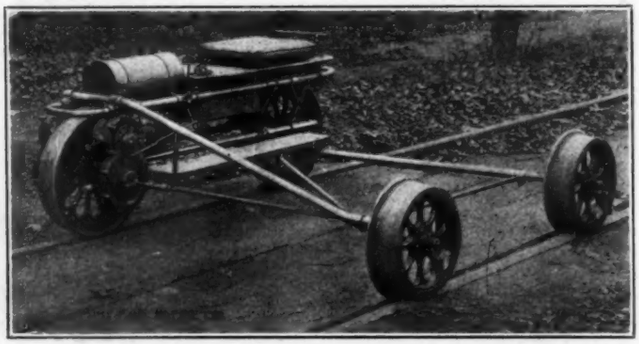
"The Olympia show is more of a coach-makers' exhibition than it is a show of mechanical construction. The fore-door idea is practically universal and the bodies run more to curves than they do with us. The Knight engine seems to be meeting with much favor, although a spirited controversy is now going on as to the merits of the poppet valve as against the sliding valve motor.

"I noticed one remarkable and noteworthy fact with regard to the show that illustrates the difference between social conditions over there and the same conditions here. It was being gravely discussed whether the general public should be admitted to future automobile shows. It was maintained on one hand that the attendance should be restricted to those who were able and actually intended to purchase a car.

"The condition of our affairs over there is progressing satisfactorily. The site for the factory has not been announced so far, but it will be in due course. With the advantage of our organization there is no question in my mind that the company can make and sell cars on a growing scale. The experience of American makers and the vast practical application they have made of it in the line of construction will undoubtedly be of much value in putting out cars for British and foreign use. In mechanical construction the American cars, in my opinion, occupy quite as high a plane as those of other lands, if they are not superior. As our product is turned out on a wholesale scale, while theirs is largely individual, the difference in cost must be in our favor and the market must be broader.

"It will be the policy of the United International Motors to adapt American methods to foreign conditions and as the composition of the United States Motor Company is largely international it is to be assumed that the usual prejudice against foreigners will be mitigated to a certain extent as far as we are concerned."

During his trip to Germany Mr. Briscoe laid the foundation for a German branch of the international company.



Railroad automobile of compact form

Storrow Heads General Motors

At a meeting of the directors of the General Motors Company, held in New York late Wednesday afternoon, four directors of the First National Bank of Detroit were ratified as members of the new board of General Motors. They are: Emory W. Clark, M. J. Murphy, Andrew Green and Thomas Neal.

Later an election of officers was held and James J. Storrow, representative of Lee, Higginson & Company, of Boston, was chosen president; W. C. Durant was re-elected to the first vice-presidency; W. J. Mead, general manager of the Olds Motor Works, was also elected vice-president, and C. R. Hathaway, secretary and treasurer.

Among other matters considered was the proposed removal of the general offices of the company from New York to Detroit.

President Storrow is expected to go to Detroit within a few days to arrange the transfer and other affairs of the company.

The First National Bank of Detroit has already distributed over $4,000,000 in liquidating the debts of the reorganized company.

Takes Place of Railroad Velocipede

THREE RIVERS, MICH., Nov. 28—The accompanying photograph shows a railway automobile of unique design and much power, which is made by the Sheffield Car Company. The engine of this device develops 30 horsepower. It is used for a large number of purposes, including inspection, track repair and generally for anything that requires quick transportation upon a railroad.

Road Builders to Meet in Annual Convention

THE seventh annual convention of the American Road Builders' Association will be held at Indianapolis, December 6 to 9 inclusive. The program is assuming form. Acceptances from quite a number of prominent men are expected before a detailed arrangement of dates and hours can be fixed. Among those who have consented to make addresses or prepare papers on subjects with which they are especially familiar are the following:

N. J. Bachelder, Master of the National Grange, "The National Grange and Good Roads."

F. J. Robinson, Deputy Minister of Public Works, Province of Saskatchewan, Canada, "Pioneer Road Making in Saskatchewan, Canada."

Samuel Hill, president Washington State Good Roads Association, "Convict Labor in Road Building."

S. Percy Hooker, chairman New York State Highway Commission, address (subject to be announced).

Major W. W. Crosby, chief engineer Maryland State Roads Commission, "A Division of Road Interests for Better Results."

James H. MacDonald, State Highway Commissioner of Connecticut, address (subject to be announced).

Harold Parker, chairman Massachusetts State Highway Commission, address (subject to be announced).

Col. Frederick Gilkyson, Commissioner of Public Roads of New Jersey, address (subject to be announced).

A. B. Lea, director Public Service of Cleveland, Ohio, "Relation of the City to Its Adjacent Country Highways."

A. N. Johnson, State Highway Engineer of Illinois, "Some Features of Road and Bridge Construction."

E. J. Watson, Commissioner of Agriculture of South Carolina, address (subject to be announced).

James C. Wonders, State Highway Commissioner of Ohio, "Present Highway Laws of Ohio and the Proposed New Law."

C. D. Miller, Assistant Territorial Engineer of New Mexico, address (subject to be announced).

Jos. W. Hunter, State Highway Commissioner of Pennsylvania, "Application of the Highway Law of Pennsylvania."

Townsend A. Ely, State Highway Commissioner of Michigan, "Progress of Road Building in Michigan."

Logan Waller Page, director U. S. Office of Public Roads, "State Highway Legislation."

Geo. W. Cooley, State Engineer of Minnesota, address (subject to be announced).

Charles P. Light, Commissioner of Roads of West Virginia, "Earth Roads."

Jos. Hyde Pratt, State Geologist of North Carolina, "The Best Method of Supervision and Control of Road Construction in a State."

Samuel H. Lea, State Engineer of South Dakota, "Road Building in South Dakota."

T. R. Atkinson, State Engineer of North Dakota, "Road Building in North Dakota."

Paul D. Sargent, State Highway Commissioner of Maine, address (subject to be announced).

W. O. Hotchkiss, chief of Highway Division, Geological Survey of Wisconsin, address (subject to be announced).

P. St. J. Wilson, State Highway Commissioner of Virginia, address (subject to be announced).

W. S. Gearhart, State Highway Engineer of Kansas, "Bridge and Culvert Construction."

Good Roads Men for Organization

WASHINGTON, D. C., Nov. 28—One of the most important good roads meetings ever held in this country culminated Tuesday in the formation of the American Association for Highway Improvement with Logan Waller Page, director of the office of Public Roads, as president. W. C. Brown, president of the New York Central lines, was elected vice-president; Lee McClung, treasurer of the United States, treasurer, and J. E. Pennybacker, Jr., chief of road management, Department of Agriculture, secretary.

The executive committee is composed of a number of leading railroad presidents, automobile men and others.

Virginia Autoists Plan New Road

RICHMOND, Nov. 28—With the view of building a new automobile road in Virginia, which will connect Richmond and Newport News, the automobile clubs of the two cities are effecting an organization which it is thought will be completed by January 1 and ready to begin actual work upon the proposed new highway.

The distance between the cities is just eighty-six miles, and a route has been mapped out which will make the trip one of but four hours by automobile. W. F. Gordon and L. M. Foster recently selected the proposed road, posting signs along it. They were accompanied from Newport News by President W. A. Post, of the Newport News Automobile Club, and L. B. Manville. Both are very optimistic over the prospect.

The Passing of the 23rd Street Ferry

Coincident with the opening of the big new station on Seventh Avenue, the "Pennsy's" old Twenty-third Street Ferry to Jersey city has been abandoned. Users of the Official Automobile Blue Book will be glad to know that an equally good route to Newark is offered via the Forty-second Street Weehawken Ferry, with but slight difference in mileage when starting from up-town points.

Below is reproduced the complete route from the ferry to Newark, as it will appear in the 1911 edition of the Blue Book, together with a map which shows this connection and the availability of the Forty-second Street Ferry for reaching Passaic, Hackensack and Englewood.

Forty-second St. Ferry Connections into North Jersey

Peeps Through Auto Goggles at Distant Lands

MADRID has 775 licensed automobiles; but there are no automobile trucks. One reason is because gasoline costs 48 cents per gallon. Doubtless there would be a more rapid increase in the number of private automobiles if it were not for the ultra-conservatism of the old aristocratic families, the great majority of whom are inclined to stick to their horses and carriages. Again, the prices that are demanded for machines by the Madrid dealers would in many instances be considered exorbitant even in the United States. As a rule the machines used in Spain are from 10 to 16 horsepower. But as a number of these cars are out of date the owners are anxious to sell their old machines and purchase new ones of higher horsepower. There would appear to be a market there for moderate-price cars and the demand for them will grow. The roads in and around Madrid, as well as in many parts of Spain, are quite equal to the famous roads in France. Even in the face of Spanish conservatism many aristocratic families, following the wake of the sport-loving young king, are taking to automobiling as a fashionable diversion and automobile excursions have become the fad throughout various sections of the country. There is not an American car to be seen in Madrid. One reason for this is the fact that local dealers are bound by contract with European manufacturers not to handle American-made machines. Besides, the fault is, to a certain degree, with the American manufacturers themselves. It should be understood that in order to sell cars in the capital of the dons it is absolutely necessary that they should be placed on exhibition, thoroughly tried out, and the cost of delivering the machines in Madrid plainly stipulated. The catalogue and letter-writing method of doing business does not go in Spain. It is a mere waste of time and postage. It is also indispensable that the salesman representing the manufacturer shall speak the Spanish tongue. The bodies used in building automobiles in Spain are of foreign make. The Spanish customs provide for a high tariff on motor cars imported into that country.

A company has been organized for the purpose of furnishing the principal cities of Australia with an effective system of taxi-cab service. Four-cylinder, 15-horsepower cabs are being put into commission. With the exception of 25 of the bodies, which were manufactured in and sent out from London, the remainder will be made in Australia. Three hundred taxicabs will comprise the complement. Their operation will be regulated by the new Motor Act of the State of Victoria, which provides for the registration and the licensing of motor cabs to ply for hire. Under this act provision is also made for ranks and stands, and a schedule of rates has been established similar to those fixed for ordinary cabs.

At Dawson, in the Yukon Territory, Canada, there are now two automobiles in use: A 60-horsepower, 3-passenger car and a 20-horsepower, 4-passenger machine. There is one touring car in the Klondike, a 7-passenger, 35-horsepower machine. The passenger tariff is a cheerful item for a chauffeur to contemplate, namely, $15 for the first hour; $10 for the second hour, and $75 for the day. The car in question drinks ten gallons of gasoline each day, at a cost of 75 cents per gallon. The chauffeur receives $150 per month and his expenses. Freight rates for automobiles by the White Pass and Yukon Route are $190 per ton.

The automobiles in use in Johannesburg, which constitutes a larger market for machines than all of the rest of South Africa combined, are of various grades, including German, French and English, a very few American, and a small percentage of Italian patterns. The highest price cars in use are made in Continental Europe and in England. They range in price from $5,000 to $10,000 delivered in Johannesburg. While there are many high-price cars in commission there, and although the market for this class of cars is encouraging, the expensive machines are mainly bought by or for the parties desiring to use them. For this reason expensive cars are not as a rule kept in stock by the local dealers. There is a fifteen per cent. duty on automobiles imported into South Africa, based on the value of the machines, a 3 per cent. preference being given in favor of machines manufactured in the United Kingdom, and therefore reciprocating in the case of British Colonial trade. The popular demand is for cars of from 16 to 20 and from 20 to 28 horsepower, whose seating capacity is from three to five persons. There also is a call for cars of the small runabout class. Climatic conditions are to be considered by exporters of cars into South Africa. The climate being very dry, it is necessary that any wood used in the construction of machines shall be thoroughly seasoned. It is due to neglect in this direction that many complaints are made relative to wooden wheels. Preference is given to aluminum bodies. Bad roads obtain in the country as a rule. There are a large number of streams to be crossed while touring. Therefore, high clearance is demanded. Some of the machines have a clearance of not more than eight inches, which is not enough in the event of crossing a stream. Neither is this enough when running over roads having deep ruts and high crowns made by the wheels of wagons. The springs should be made very heavy. At least one leaf should be added to the ordinary spring for use in South Africa. Flimsy axles bend after having run over rough country roads a short time. The favored plan is to reinforce the front axle with a strong bow-string, or with a sort of truss. As the hot climate dries out the wood very rapidly, it is necessary to use the highest grade of paint.

New York Goes After Smoking Autos

Officers of New York have started a movement, headed by Mayor Gaynor, to suppress the smoking automobile. Investigators, in securing evidence of the prevalence of this abuse, have reported that about one-third of the automobiles that are driven about the city violate the provision of the Sanitary Code prohibiting excessive smoke.

The movement is based on sound sense, for a smoking automobile is not only a nuisance to the public generally, offensive to the senses and flagrantly illegal, but it is indicative of ignorance on the part of the driver and is wasteful and careless practice.

Smoke is caused by the excessive use of lubricating oil in the engine. Where such conditions exist it shows that little knowledge of the motor is possessed by the operator. In the first place excessive lubrication is a potent cause of carbon deposits in the cylinders; it decreases power when the motor is throttled down for slow motion; it lends itself to defective combustion and augments slipping gears. With excessive lubrication, flexibility, so much desired in heavy traffic, is spoiled.

Then, too, the practice is costly without adequate return.

The man who obeys the law with regard to smoke is a better driver than the one who comes under the ban. He saves expense in two ways—his oil bill is not so large and he avoids fines.

Electric Vehicle Men in Meeting

With an attendance of about 100 the first regular monthly meeting of the newly formed Electric Vehicle Association of America was held Tuesday night. C. L. Morgan made an address on the essentials of operation and care of commercial trucks. He advocated more care in inspection and periodic overhauling. The society has a membership of 250.

Floods Threaten French Automobile Plants

PARIS, Nov. 21—There is every indication that French automobile manufacturers will be as seriously affected by floods this winter as during last season. Even now, at the beginning of the winter, the river Seine is in an abnormal condition, and although none of the factories is yet flooded it only needs another foot rise to bring the water to their doors. The situation is rendered serious by the fact that practically nine-tenths of the automobile factories of France are grouped along the banks of the river Seine, just below Paris; that the river and all its tributaries are high and still rising, and that the ground is so sodden by several wet seasons that it has no further powers of absorption.

Although adequate warning has been given of the possibility of floods this winter, very few preventive measures have been taken. To remove all possibility of danger would entail an expenditure of several million dollars, and a series of changes requiring five to seven years to accomplish. Temporary measures have been adopted in the city of Paris; but in the suburbs, where all the automobile factories are located, nothing has been done by the authorities.

Profiting by last year's experience, arrangements have been made by manufacturers for putting up dikes and using powerful pumps, whenever necessary, and much valuable machinery has been removed to positions of safety. Thus, supposing the record height of last year is again attained, the damage will be less, but it will not prevent the total or partial closing down of some of the leading factories. The firms most seriously threatened are Brasier, Renault, Darracq, Charron, Gnome, Unic, De Dion Bouton, Bayard-Clement, Continental tires, and Bosch magneto. Among the few altogether out of reach of the floods are Panhard-Levassor and Delahaye, both of which are located on high ground within the city of Paris.

France now seems to regret her decision to abstain from racing, for it has just been decided that there shall be a big speed test next year, to be known as the Grand Prix de France, and to be run on a fast course in the Sarthe district, on some date between May 15 and July 15. It is the Automobile Club de la Sarthe which is responsible for the race, with the patronage and official sanction of the Automobile Club of France.

The racing board of the French club is under a vow not to promote any road race, but as the last two seasons have shown abstention to be a mistake the leaders are quite willing to turn the difficulty by backing a race promoted by a private club. The Sarthe district is the one in which the 1906 two-day Grand Prix was held. Its roads provide perfect, well-surfaced straightways of a switchback nature.

Two races are scheduled for next year, one for cars limited to 4.3 by 7.8 inches bore and stroke, and another for any type of car of any weight or power. The two races will be run on the same day, over a distance of about 370 miles. In addition to medals offered by the Automobile Club of France, there will be a trophy for the winner in each class of the value of $1,000, or this amount in cash. Entries will be received until February 1, 1911.

Objections will doubtless be made by constructors to the dimensions fixed for the limited power cars. France is much more interested in cars of 80 or 90 millimeters bore (3.1 and 3.5 inches) than in those of 4.3 inches, the great majority of motors for next season not exceeding 3 1-2 inches bore. Several firms are now producing standard touring cars with a stroke twice the value of the bore, and one French firm will confine itself next year to cars having a ratio of 2.42 to 1 stroke to bore; these, it must be remembered, are standard touring cars, as delivered to the public, and not special racing models. For these latter the ratio runs as high as 4 to 1.

The unrestricted class is not likely to reveal anything new. It is doubtful if there will be many specially constructed cars in the unlimited class; such firms as Fiat, Benz, Lion-Peugeot, Opel and a few others already having fast cars may be expected to enter them, but the old French houses have so long neglected special racers that they are not likely to come back to the game with any relish.

The raising of the bore limit to 110 millimeters will keep out an important group of the smaller firms having done a lot of pioneer work with motors of not more than 90 millimeters bore. These firms will have to build special motors to enter in either class, whereas had the limit been lower they could have entered in the limited bore class with modified stock cars costing very much less to build than a special racer. Although the Automobile Club of the Sarthe can be congratulated on taking up a work that the Automobile Club of France has long neglected, its technical regulations are far from being satisfactory.

Mercedes Patents Sustained in England

LONDON, Nov. 21—Mercedes patents upon gate change speed control, honeycomb radiator, honeycomb radiation in connection with fly-wheel fan, brake cooling device and dished axle and differential, which were called into question by the Fiat Motor Company, have been sustained and the report is current that the applicants for the overthrow of the patents already have paid over about $100,000 in royalties.

The main question raised was as to the jurisdiction of the British courts where the patented device was manufactured abroad. Throughout the litigation the courts upheld the patents. Several other actions are contemplated by the Mercedes company against British manufacturers who have been infringing upon the radiator and the gate speed control devices. The matter has been in the courts for 18 months.

Motor Taxes Are Higher Abroad

PARIS, Nov. 21—The following comparative table shows the amount that would have to be paid in taxation for one year on a five-passenger car with four-cylinder motor of less than 4 inches bore in Paris, the French provinces and Belgium. The sums spent on driving licenses are included, although in some cases a driving license once secured is good for all time.

	Paris	French Provinces	Belgium
Car tax	$35.08	$11.28	$4.80
Horsepower tax	22.80	11.28	25.00
Car registration	0.12	0.12	none
Owner's driving license	4.00	4.00	none
Chauffeur's license	4.00	4.00	none
Road making tax	none	6.24	none
Gasoline tax	54.48	17.28	none
	$120.48	$54.20	$29.80

Syracuse Chauffeurs Organize

SYRACUSE, N. Y., Nov. 28—The Chauffeurs, Automobile Drivers and Automobile Workers' Association of Syracuse is just formed, not as a trade union, it is stated, but for mutual benefits. A principal object is the watching of legislation, and an effort is afoot to have the automobile workers in other cities of the State form similar organizations.

When this is done efforts will be made to try and secure a reduction of the annual $5 fee for registration, which the drivers think excessive. The Callan bill sets this fee, which is higher than that of other States.

The Syracuse organization is incorporated, the directors being Robert W. Masters, John C. Greaves and Christopher Murphy. At the organization the members were addressed by Assembly Clerk Ray B. Smith and Senator-elect J. Henry Walters.

News in Brief from the East, West and South

NEW YORK, Nov. 28—Announcement is made by the Farrell Auto Company, of Brooklyn, that it has taken on the agency of the Beyster-Detroit business wagon.

PITTSBURGH, Pa., Nov. 28—The Inter-State Company is preparing to move its Pittsburgh headquarters to 5817 Penn avenue.

DENVER, COL., Nov. 28—The world-touring Hupmobile which left Detroit two weeks ago reached this city in good condition and started West, after a short rest for the party.

LOS ANGELES, CAL., Nov. 28—The Premier car, in charge of Ray F. McNamara on its transcontinental trip, has reached this city after a series of experiences that run the whole gamut of motoring fortune. The car was in the midst of a terrific storm in Arizona last week and was out of communication with civilization for several days.

PHILADELPHIA, Nov. 28—Taking advantage of the fact that there were many changes wrought in the Pennsylvania Legislature at the last election, the Pennsylvania Motor Federation has become unusually active in urging sane automobile laws and good roads. A number of candidates were pledged to the cause of adequate laws on these subjects before they were given the support of the Federation.

DETROIT, Nov. 28—David Hunt, Jr., general manager of manufacturing for the E-M-F Company, was killed Sunday, when his car turned over near Yale, Mich. The car skidded on the edge of a steep embankment. He leaves a widow and daughter.

DETROIT, Nov. 28—Representatives of the Chalmers Motor Company met in annual convention here to-day and will remain in session until December 1. Over 150 salesmen were present.

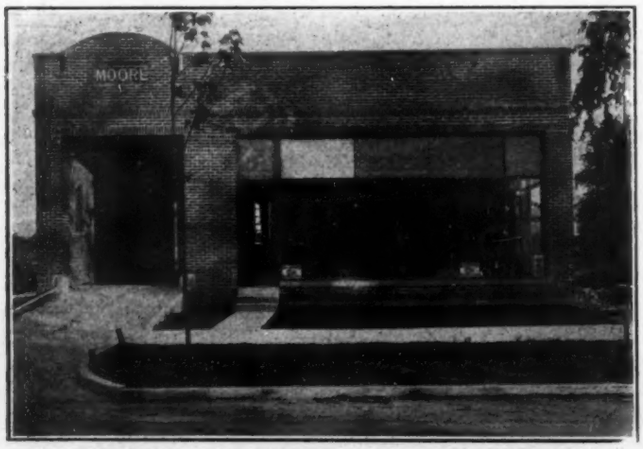
CHICAGO, Nov. 28—R. S. Fend, superintendent of agencies of the Woods Motor Vehicle Company, has left on a tour that will include the Pacific coast territory.

INDIANAPOLIS, Nov. 28—The Croxton-Keeton Motor Company, of New York, Inc., will control the sale of Parry cars in the city of New York for the season of 1911. The salesrooms are located at 1662 Broadway.

MEXICO, Nov. 28—The United States and Mexican Trust Co. has been appointed sales agent for the Lozier cars in the Republic of Mexico.

NEW YORK, Nov. 28—Chas. E. Miller announces the removal of the Brooklyn branch of his company to 1420 Bedford avenue, corner of Prospect place.

SYRACUSE, N. Y., Nov. 28—The Automobile Dealers' Association of Syracuse, at a meeting of its board of directors this week, elected John H. Valentine treasurer to succeed Harry Conde, who resigned to leave Syracuse and engage in the automobile business elsewhere.



Garage and salesroom of the W. C. Moore Auto Company, which has just been completed at Wilkes-Barre, Penna.

BOSTON, Nov. 28—The Massachusetts Motor Company has been formed in Boston and incorporated under the laws of Massachusetts to handle the Oakland car in the Bay State east of Hampshire, Franklin and Hampden counties. G. B. Williams is president; F. D. Stranahan, vice-president; W. H. Tucker, treasurer; F. S. Snow, secretary, and F. A. Daly, manager. Mr. Stranahan formerly handled the Buick in Boston. Salesrooms have been opened at 591 Boylston street.

BOSTON, Nov. 28—Dr. Charles G. Percival and Montague Roberts, who are doing 100,000 miles in an Abbott-Detroit car, reached Boston in time to have Thanksgiving with some of the former's relatives. On Friday they were introduced to Mayor Fitzgerald by E. P. Blake, the Boston representative for the Abbott-Detroit, and handed him a letter from the Mayor of Detroit. Then they started for Maine. They had traveled 17,000 miles when they reached Boston.

PORTLAND, ORE., Nov. 28—Business men, farmers and automobilists throughout Oregon have joined hands in the road-bettering movement in a definite way since the adoption of the amendment at the recent election making it possible for counties to provide funds as they elect for road construction.

BOSTON, MASS., Nov. 28—Peter Cole, formerly of Chicago, has just accepted the position of superintendent of the maintenance department of the Velie Motor Vehicle Co., of the New England States, with headquarters at No. 8 Waltham street, Boston.

NEW YORK, Nov. 28—The Havoline Oil Co. has made an arrangement with the Indian Refining Co. whereby the latter will act as distributing agent for Havoline automobile lubricants.

MERIDEN, CONN., Nov. 28—The Connecticut Telephone & Electric Co., of Meriden, Conn., is distributing 1911 catalogs covering automobile and motor boat ignition specialties. This catalog describes the new Connecticut Magneto in detail. Other types which are illustrated are the new Connecticut Shock Absorbers, Hinged Bracket Spark Coils, Magneto Lock Switch, new type Steering Wheel Switch, new 1911 Pocket Meters and Connecticut Auto Lock.

SOUTH BEND, IND., Nov. 28—Ground has been broken for the new building which will be occupied by the United States Motor Car Co. as a garage and salesroom. The building will be two stories at the present, although the foundation will be constructed capable of supporting a ten-story structure.

OMAHA, NEB., Nov. 28—C. L. Gould, manager of the Omaha branch of the Ford Motor Car Company, has contracted with the following new agents for 1911 cars: Glass & Evans, Cushing, Neb.; Johnson & Nelson, Newman Grove; Campbell Auto Company, Campbell; Lichliter & From, David City; Reeves & Linn, Madison; West Brothers, Wisner, and C. A. Darling, Lyons.

CLEVELAND, Nov. 28—F. S. Gassaway, formerly manager of the New York branch office of the Willard Storage Battery Co., has been transferred to the main office at Cleveland, where he will act as general manager of sales.

NEW YORK, Nov. 28—Among the passengers arriving on the *Mauretania* last week were Charles Y. Knight, inventor of the "Silent" Knight motor.

INDIANAPOLIS, Nov. 28—The G. & J. Tire Co. announces that it has made arrangements with the Oriental Rubber Company, of 1140 Bedford Avenue, Brooklyn, N. Y., whereby the latter company will in future act as sole representative for G. & J. tires for Kings County, New York.

KANSAS CITY, Nov. 28—The Winton Motor Car Co. has established a permanent branch house at 3328-3330 Main Street, with George Arbuckle as manager.

ROCKFORD, ILL., Nov. 28—The Cotta Transmission Company, of Rockford, Ill., maker of the "Cotta Transmission," has reorganized and resumed operation under new management.

What the Makers and Dealers are Now Doing

PORTLAND, ORE., Nov. 28—During the past week the Portland Automobile Dealers' Association held their third annual banquet at the Portland Commercial Club. Seventy-five automobile dealers, representing practically every automobile sold in Portland, were present and celebrated the completion of the best year that the automobile industry has known in Portland.

The toastmaster of the evening was Charles F. Wright, of the firm of Ballou & Wright, president of the association. The guest of honor of the evening was E. Henry Wemme, the leading spirit in the automobile industry in Portland since its inception.

To Manufacture Two Inventions

BOSTON, Nov. 28—Carmine Basile, a young Italian engineer who has been in America a few years and formerly worked in some of the big motor factories, has formed the Basile Automobile Company at Boston, capitalized under the Massachusetts laws for $150,000, for the purpose of putting on the market some of his inventions.

One of these, for which patent papers are pending, is a device to gain economy of operation. Another device is an automatic arrangement to be attached to each wheel so that a motor car may go over obstacles or depression in the road without the body of the car being changed from its horizontal position.

Elmore Plant Nearly Finished

DETROIT, MICH., Nov. 28—The roof of the Clyde plant of the Elmore company has been completed, and machinery from the old factory is now being removed to its new location. The addition of this big factory to the plant of the Elmore gives a capacity of 3000 cars during the coming year.

Coggswell Company to Start Work Jan. 1

GRAND RAPIDS, MICH., Nov. 28—The "Coggswell 35," a four-cylinder, five-passenger car with bore of 4 inches and stroke of 4 1-2 inches, is to be made by the Coggswell Motor Car Company. The company, which was formed recently, is capitalized at $250,000 and active work will commence about January 1. It is intended to assemble the cars only at first, letting out the manufacture of parts to various concerns.

Automatic Machinery Makers Merge

DETROIT, Nov. 28—Through a deal just consummated Detroit becomes headquarters for the largest automatic machinery company in the world. The deal involves a consolidation of the Potter & Johnston Company, of Pawtucket, R. I., the large manufacturers of automatic machinery in America, and the Grant & Woods Manufacturing Company, of Chelsea, Mich., manufacturers of automatic screw machinery and balls for ball bearings.

The Potter & Johnston Company is capitalized for $1,500,000, one-half of its product going abroad. The Grant & Woods Company, organized a few months ago by Detroiters, has a capital of $1,000,000, all paid in. The company has a large plant at Chelsea, a few miles from this city, and is engaged in manufacturing automatic machinery for turning out nuts, bolts, cap screws, piston pins and bushings. Bearing balls are made at Chelsea after the German method on Grant machines, which are controlled in this country by the Chelsea concern.

The Potter & Johnston Company will continue to operate in Pawtucket, but it is understood that as a result of the consolidation the Chelsea plant will be materially enlarged. The executive and selling headquarters for both companies will be located in Detroit.

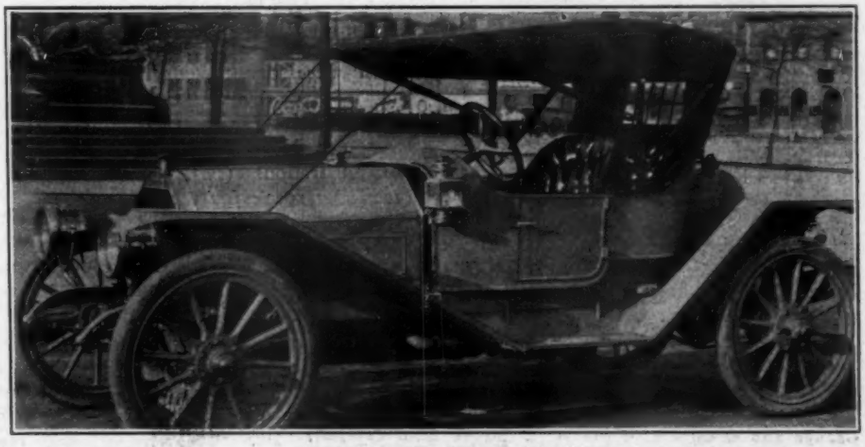
New Six-Cylinder Nance

Nance Motor Car Company, of Philadelphia, Pa., Introduces a New Car

INTENDING to supply the wants of a discriminating clientèle of the character which expresses its preference for six-cylinder, long-stroke motors, the Nance Motor Car Co., with headquarters at 1209-1217 Vine street, Philadelphia, Pa., is ready for business. The general appearance of the new automobile is shown in the accompanying illustration. The body is of the fore-door type, and is regularly equipped in the manner shown, including a top. The wheelbase is 122 inches, with a tread of 56 inches, and the regular tire equipment is 34 inch. The power plant is of the unit type, 4-cylinder, water-cooled, and the motor is rated at 35 horsepower, at 900 r.p.m. The cylinders are 3 5-8 inches bore by 4 1-16 inches stroke. The carbureter is of the Stromberg type, and ignition is by the Bosch Dual system. The radiator is of the true honeycomb type.

The power plant is platformed by a cold-pressed channel section frame, narrowed at the front with a drop over the rear axle. The front axle is a drop-forged I-beam of stout dimensions. The rear axle is of the full floating type, equipped with internal and external hub brakes. The shaft drive is straight line. The steering gear is of the irreversible screw and worm type with an 18-inch steering wheel. The rake of the steering post is 30 1-2 degrees.

The company announces that it is prepared to offer two options to its purchasers, the first of which is in the form of a 5-passenger touring model and the second in the shape of a runabout. The power plant and other mechanical features remain the same in both cases. When it is considered that the price of this car is $1,900, and due allowance is made for the excellence of design and construction, it will be readily appreciated that the company is preparing to "popularize" six-cylinder automobiles from the price point of view, and taking advantage of the state of the art, including the most modern and well thought out facilities, the undertaking must be regarded as ambitious.



New six-cylinder Nance car, which is the latest Philadelphia offering with a $1,900 price tag

Among the Accessory Makers

THOMAS AUXILIARY SPRING; SIMPLEX VACUUM BOTTLES; SECOND-MAN TIRE TOOL; MICHELIN NON-SKID TIRE; HAGSTROM BLOW-OUT PATCH

BOON FOR WINTER AUTOISTS

The Simplex vacuum bottle (Fig. 2) serves two purposes, viz.: to keep liquids hot or cold, as may be desired. At this

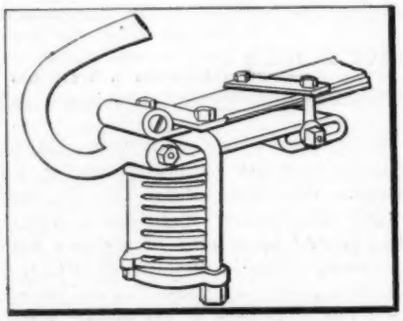


Fig. 1—The Thomas auxiliary spring

time of year a warm drink often relieves the occupants of a car from the biting cold, and the makers of this bottle claim that it will keep its contents hot for thirty hours. The principle of the two bottles shown is the same, the difference being that the cheaper one, the Junior, is covered with a plain japanned metal case, whereas the better quality has a metal body which is securely fastened to an aluminum or nickel top by means of four catches. The bottle may readily be removed for cleaning and sterilizing. It is made by the Simplex Vacuum Mfg. Co., 369 Washington Avenue, Newark, N. J., and the New York City branch is located at No. 156 Fifth Avenue.

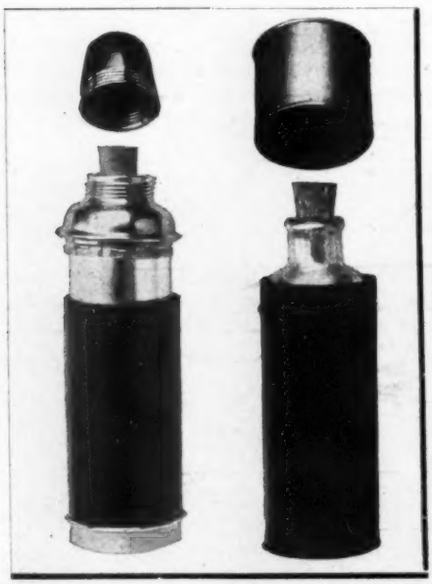


Fig. 2—Simplex and Simplex Junior Bottles

AUXILIARY SPRING TO ABSORB SHOCK

As the name implies, the Thomas Auxiliary Spring (Fig. 1) is an attachment to be fitted to each of the chassis springs of a car to prevent all the shock from road inequalities being transmitted to the latter. The device consists of a coiled spring attached inside a cage, so that when the shackle gives with the flexure of the spring the rebound action is taken up in the concertina movement of the auxiliary spring. These springs are made by the Thomas Auxiliary Spring Works, Canisto, N. Y.

A HANDY BLOW-OUT PATCH

Every autoist should carry in his kit some means of repairing a blow-out. The Hagstrom patch (Fig. 5) is designed to get a car home after a blow-out, and the sides are constructed in such a manner that

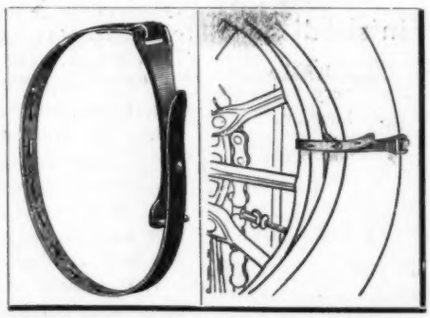


Fig. 3—A useful tire tool, and how it is applied

the metal hook will grip the rim and prevent creeping and so uncover the hole. The patch is made by Hagstrom Bros. Mfg. Co. (Inc.), Lindsborg, Kan.

SECOND-MAN TIRE TOOL

How often has a motorist wished he had another hand so as to grip the tire and prevent it leaving the rim when both of his hands are in use! A useful accessory to effect this is made by the Gus Balzer Co. (Inc.), 1777 Broadway, New York, and the illustrations (Fig. 3) practically speak for themselves. The device consists of a band partly of steel and partly of leather; the leather part has eyelets and these can be hooked over a stud after the band has been passed round the felloe of the wheel, holding the tire firmly to the rim.

MICHELIN "SEMELLE" NON-SKID

The idea depicted in Fig. 4 is being marketed by the Michelin Tire Company, of New York City, and it is based upon the

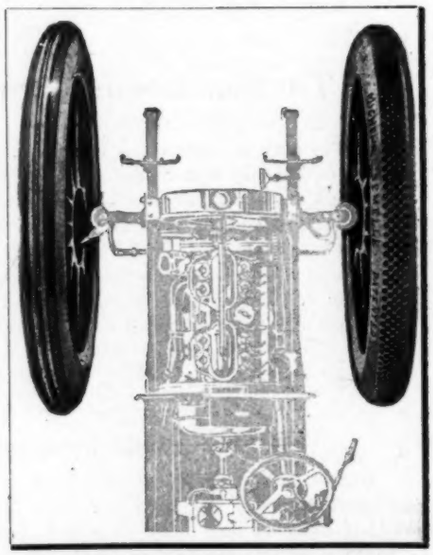


Fig. 4—Non-skids on opposite wheels

use of diagonally placed non-skid tires on one of the two front and rear wheels, respectively, of an automobile. It is claimed for this plan that it prevents skidding of either the front or rear ends of the automobile, requiring the use of but two non-skid tires. The non-skid tire furnished by the makers for this work consists of a strip of specially prepared leather and steel studs that cover the part of the tire that touches the road. The makers claim that the use of this non-skid does not reduce the resiliency in the least, as the leather does not inclose the entire casing. The experiences so far with this form of non-skid, coupled with this method of applying, have worked out well.

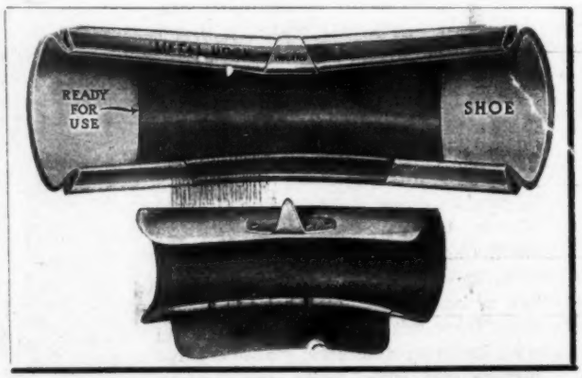


Fig. 5—Blow-out patch and method of attachment